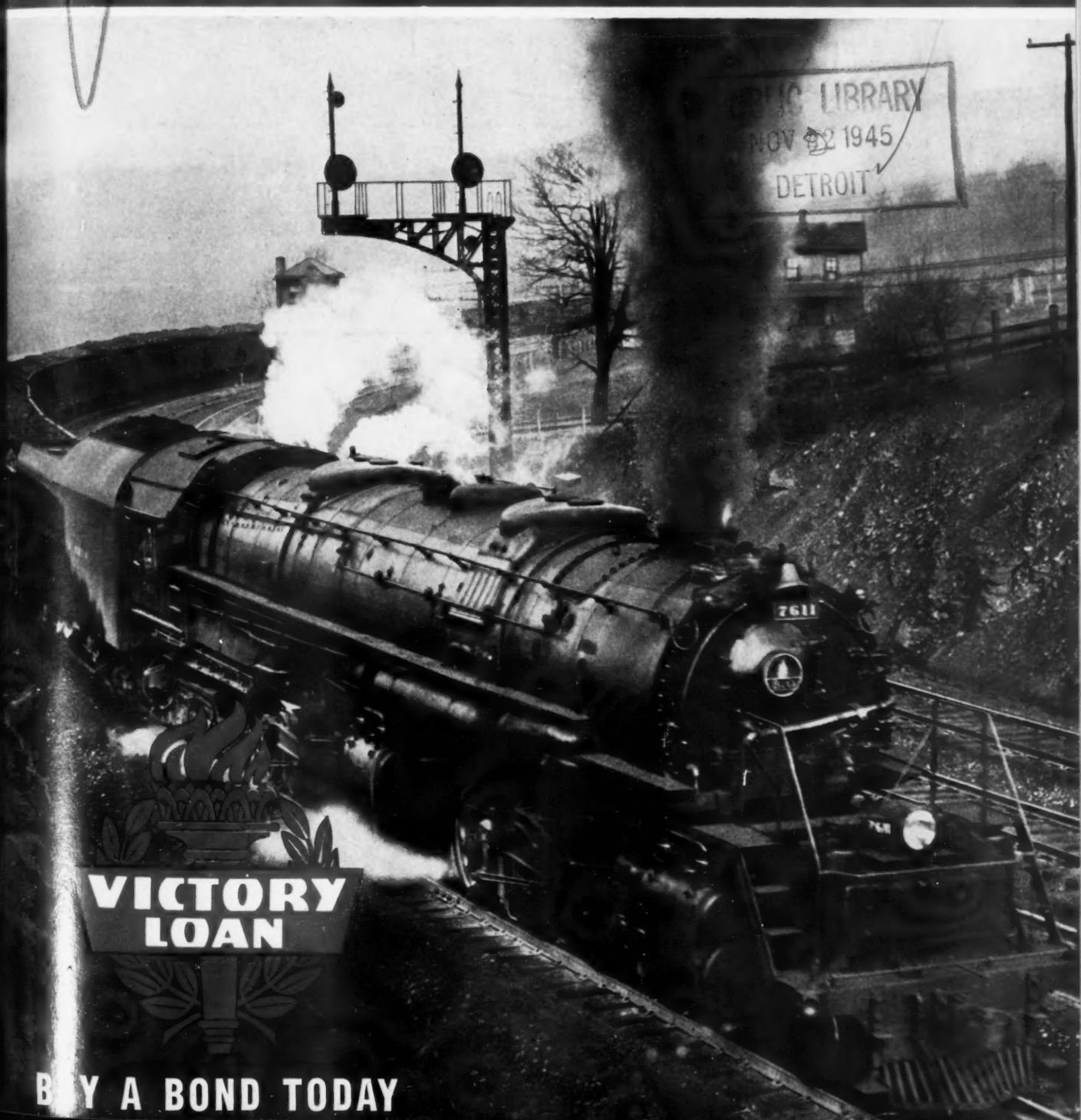
Coal Age

NOVEMBER, 1945



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DETROIT

ON THE TRACK OF A 40% SAVING

SUN MINE LUBRICANT...

Reduces Bearing-Replacements on Mine-Cars by 25%, Cuts Lubricating-Costs by 40%

A Pennsylvania coal mine had a problem lubricating car-wheel bearings. They were using a high-priced grease, but still had more than the normal share of bearing-brass replacements.

A Sun Engineer was called in and studied the problem. Synthetic rubber sponges were used to carry the oil against the journal, and had to remain elastic at all times, without glazing. The Sun Engineer recommended a special Sun oil which would flow through the sponges in sufficient quantity to supply the necessary lubricating film.

Within a few months, the new oil proved what it could do. Replacements of bearings had been cut 25%, and oil purchases 40%. Sponges remained in far better condition.

These results are typical of the work done by Sun mine lubricants and Sun Engineers in all types of mines. For every type, size, or make of mining-equipment, from tipple-top to the face of the deepest shaft, there are Sun lubricants designed to increase efficiency, cut operating and maintenance costs. Call the Sun man near you, or write...

SUN OIL COMPANY • *Philadelphia 3, Pa.*

Sponsors of the Sunoco News-Voice of the Air—Lowell Thomas

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OILS FOR AMERICAN INDUSTRY

In war or peace

B.F. Goodrich

FIRST IN RUBBER

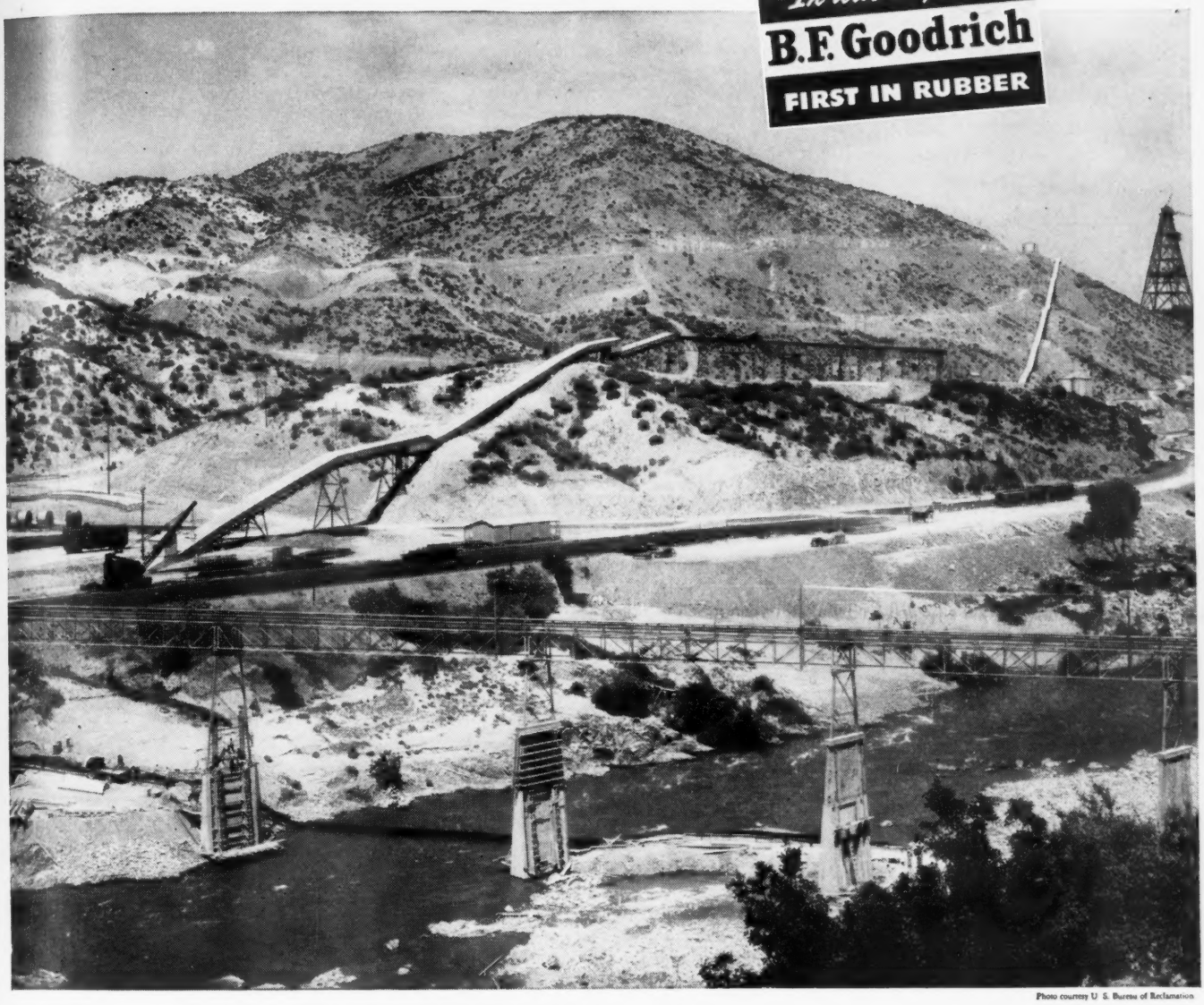

Photo courtesy U. S. Bureau of Reclamation

Carried 12,000,000 tons of material at Shasta Dam without breakdown

B. F. Goodrich cord belt praised by construction chief as it is resold at high price for further use

STARTING at left center and going out of sight in the distance is a small part of the huge belt conveyor system that moved mountains of material for the construction of Shasta Dam. B. F. Goodrich conveyor belting — 17,870 feet of it — had an important place in this big job where conveyor breakdowns meant important time and money wasted.

F. T. Crowe, General Superintendent of Pacific Constructors, Inc., builders of Shasta Dam, had this to say in a letter to B. F. Goodrich: "Of this total, 6,845 feet was of your special cord construction. Much of this belting carried 12,000,000 tons of concrete aggregate and has since been sold and is in use in various industrial plants. In this regard, the cord construction was in so much better condition that *we realized a much higher resale price than on any of the other belting.*"

Mr. Crowe goes on to say, "The system on which the belting was used operated 24 hours per day, 30 days per month. We are glad to report that *we did not lose any working time with your belting.*"

Your B. F. Goodrich distributor can tell and show you *why* B. F. Goodrich cord belt is able to give this kind of service consistently — not just once in a while — in coal mines, on docks, in every kind of industrial operation where severe operating conditions require the best and most modern conveyor belt construction for the most dependable, economical performance. *The B. F. Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

First in its Field . . . . . .

FIRST MONUMENT *Glorifying a* PEST!

Feeding chiefly on the cotton plant, the Boll Weevil pest suddenly cut the cotton yield in Alabama to 60% of normal. To stave off bankruptcy, cotton growers were forced to diversify crops—corn, potatoes, etc., but principally peanuts. So astounding and profitable were the effects of this agricultural revolution, the citizens of Enterprise, Coffee County, Alabama, erected a monument "in appreciation of the BOLL WEEVIL," whose destructive habits taught the merits of diversified farming and so eventually brought greater prosperity to the planters.

You'll find no formal monuments glorifying the results of changing over to Hulburt Quality Grease to meet the many diversified needs of lubricating coal mining equipment. But so profitable are the results of using Hulburt Quality Grease—so smoothly does coal mining machinery run—that mining men are everlastingly grateful to the Hulburt Lubrication Engineers who go right down into the mine to study their lubrication problems, then show them the correct way to lubricate their equipment with the one correct lubricant—Hulburt Quality Grease.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PENNA.

Specialists in Coal Mine Lubrication

...a record of

American Leadership

HULBURT

THE "FIRST NAME" IN

Quality GREASE

MODERN, LOW COST MINE HAULAGE —Now a Must!

Philco "Thirty" Shuttle Car Storage Battery is identified by its distinctive red connectors

There's no time to lose in getting mine haulage costs on a competitive peace-time basis. Modern battery-powered locomotives, trammers and shuttle cars are a *must.* And for power to keep such equipment working at capacity, *at lowest cost,* specify the newest in motive power Storage Batteries, the sensational Philco "Thirty" that gives 30% longer life.

★ *Tune in The Radio Hall of Fame, with Paul Whiteman and His Orchestra, Sundays, 6 P.M., EST; The Breakfast Club with Don McNeill, 9:45 A.M., EST, Mon. through Fri.—ABC (Blue) Network.*

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— FOR 6 BIG REASONS!

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What makes "Blue Center" a rope you can choose with full confidence? The Roebling ***reputation,*** for one, and the superior Roebling-made ***steel*** in the wires.

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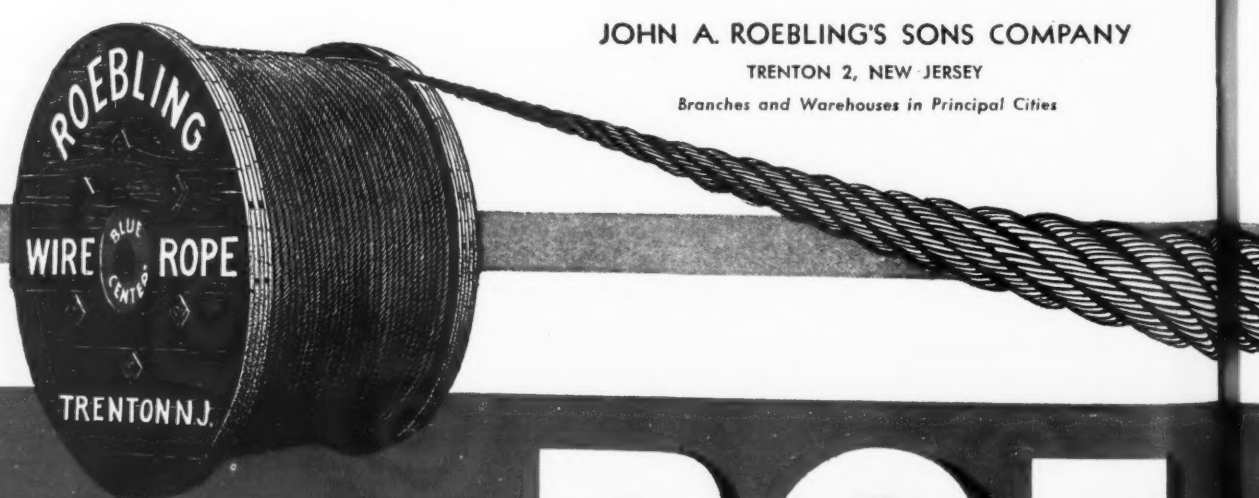

Wire Rope and Strand • Fittings • Slings • Cold Rolled Strip • Round and Shaped Wire • Wire Cloth and Netting • High and Low Carbon Acid and Basic Open Hearth Steels • Aircord, Swaged Terminals and Assemblies • Suspension Bridges and Cables • Electrical Wires and Cables • Aerial Wire Rope Systems

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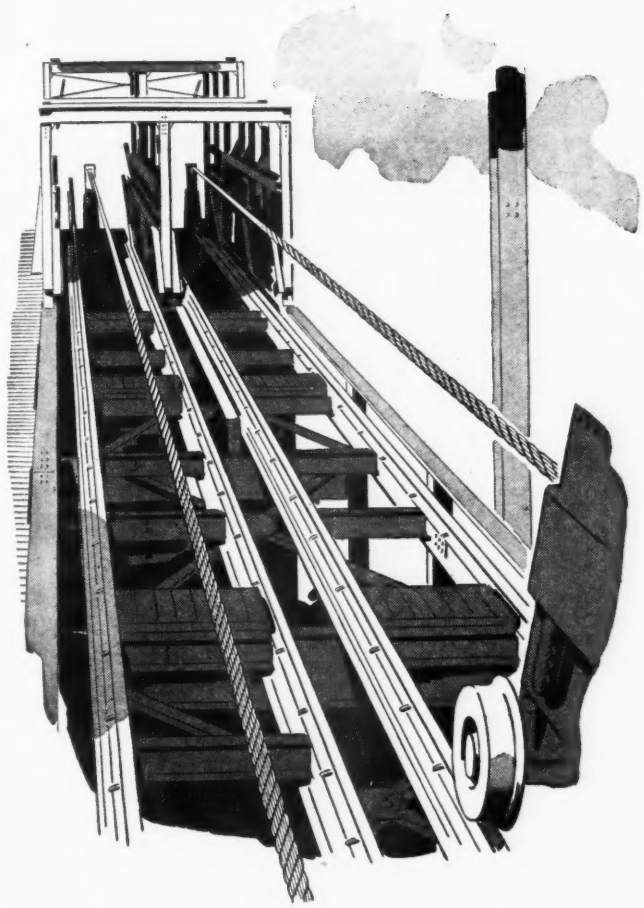
"BUY ROEBLING"



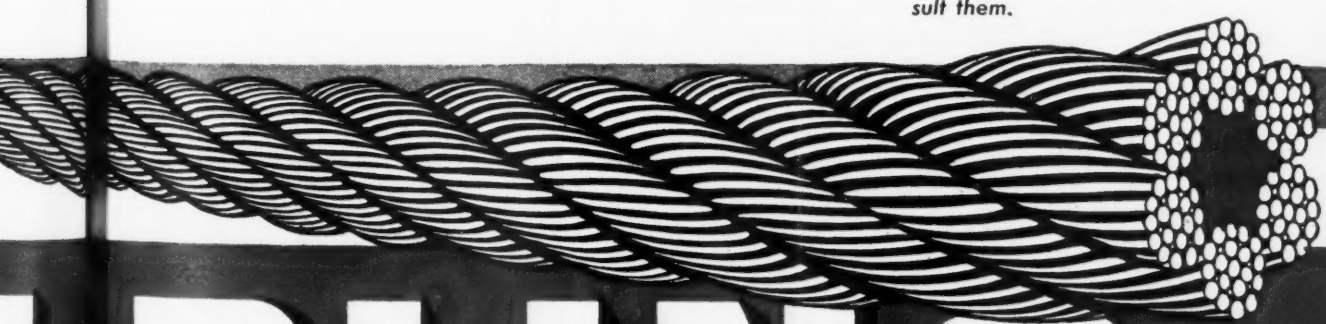
ROPE REMINDERS

Proper maintenance of wire rope pays off. And it's also a good slogan to remember in keeping comparative records of wire rope service.

It's desirable to keep accurate, complete records to check on operation. But even the most carefully kept records may be misleading, unless correctly analyzed.

For example, time on the job is not necessarily a yardstick of service. Ropes working less than average may have to contend with corrosion. Besides, a rope that operates only a few days a month may get less attention and care than a steadily working one.

The one invariable rule in record-keeping is that each installation must be considered individually. That's where Roebling engineers can be of invaluable service to you. They know wire rope, and they've had experience with a wide variety of rope-operated installations. It will pay you to consult them.



BLING

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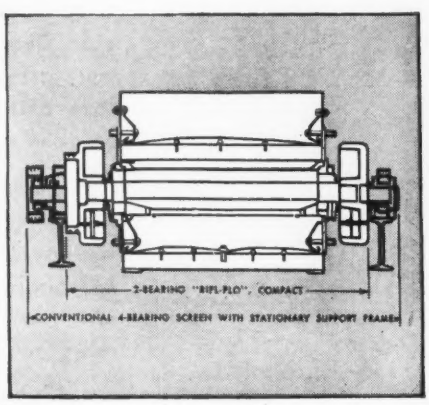
WIRE PRODUCTS

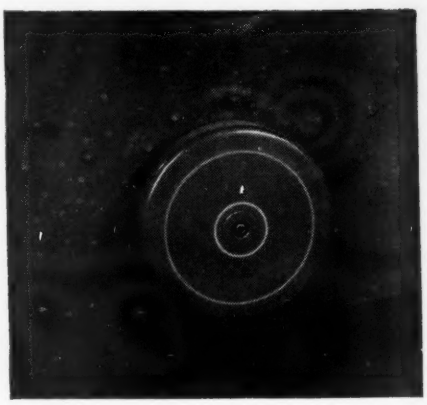
"RIPL-FLO"

HERE'S A VIBRATING SCREEN, DESIGNED FOR ALL GENERAL APPLICATIONS, THAT'S LOW IN FIRST COST AND MAINTENANCE!

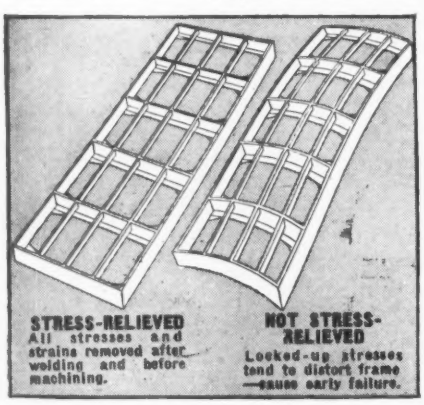
1 2-bearing "Ripl-Flo" *costs less* than any comparable 4-bearing screen, yet it's warranted to do equal or better screening job! Hundreds of these *modern* screens are in use today all over U.S.!



2 Here's one reason A-C can build "Ripl-Flo" for less money, pass savings on to you: Unnecessary outer bearings and stationary support frame are eliminated—reducing width 17%, weight 36%!



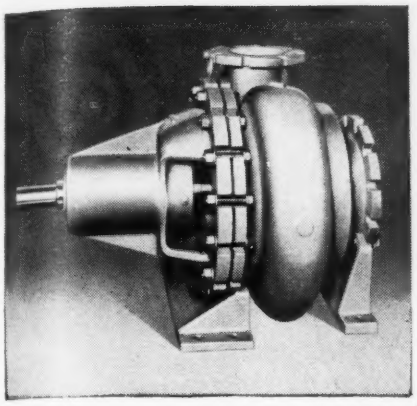
3 Balanced mechanism imparts a *perfect circle throw* to every point on screen surface. Result: uniform travel of material; rapid stratification; full capacity; and smooth performance all the way!


STRESS-RELIEVED
All stresses and strains removed after welding and before machining.
NOT STRESS-RELIEVED
Locked-up stresses tend to distort frame —cause early failure.

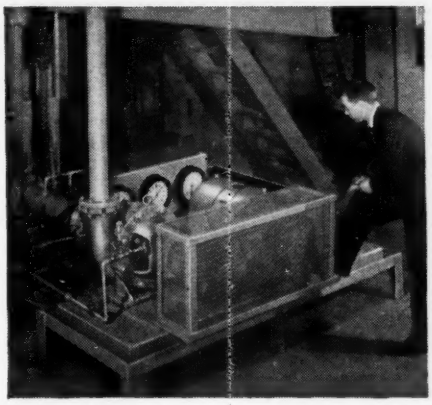
4 Want low maintenance, longer equipment life? All welded parts on "Ripl-Flo" are stress-relieved —eliminating failure adjacent to welds, making entire structure uniformly strong.

5 Every "Ripl-Flo" screen is shop-tested before it can go out to do a job for you. Operating in a special test rig, it is thoroughly checked for throw, balance, bearing temperatures, etc.

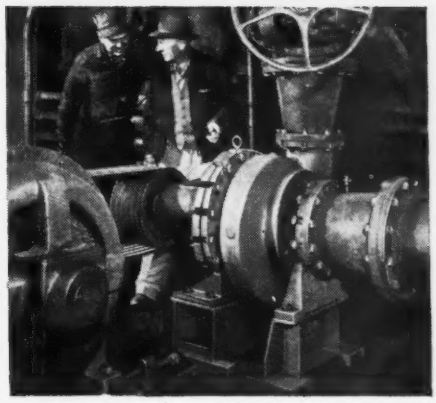
6 Call or write for new "Ripl-Flo" bulletin B6151B today. Contains quick facts as well as detailed specifications about most modern, low-cost screen in U. S.—how it's built, how it operates, etc.



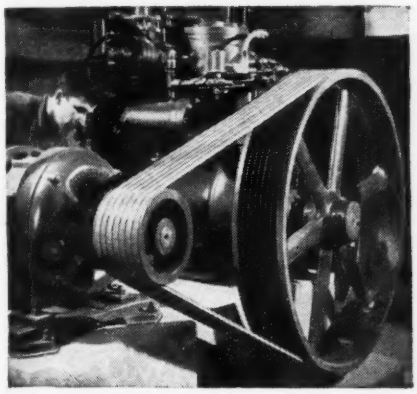
7 Another A-C product that helps lower coal preparation costs is the new Solids-Handling Pump. It is designed for coal-handling, water recirculation and sludge disposal in preparation plants.



8 Combining a *special* design plus a *new*, highly abrasive-resistant alloy, it *outlasts ordinary pumps 2 to 4 times* . . . promises a *lower cost* per ton handled than conventional units of this type.

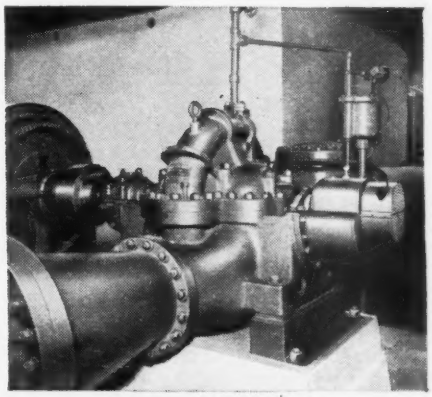


9 Mid-west coal plant uses this 10" x8", 3000 gpm, 70 ft head unit to pump return jig water, 17 to 20% solids, to settling cone. 8 sizes now developed to handle through 7000 gpm. Send for B6381.



10 A-C not only builds basic processing machinery, but motors, controls, Texrope drives needed to run it. That means unit-responsibility—no "buck-passing"!

11 Planning ahead for more efficient power distribution in your plant? This scale model "Unit Substation Builder Set" can help you plan *visually*—saves time!



12 This 2-stage Mine Dewatering Pump, rated 9000 gpm, 360 ft head is typical of A-C pumps for coal. Others in capacities from 10 to 150,000 gpm, heads to 2500 lbs.

ENGINEERING COOPERATION — ANOTHER GREAT A-C PLUS!

☛ *Cooperative engineering:* A-C engineers, working with your own staff or consultants, help select machinery for your mine, tipple, preparation plant or dock on basis of how it will fit your *entire* process. They look for ways to make *existing* as well as new equipment "team-up" for greater production. ☛ *Unbiased Recommendation:* A-C builds many types of equipment for coal. When you need screens, for example, you select from *4 different types,* get *exact* equipment you want! ☛ *Emergency Parts Service* — expediting on urgent repairs. In most cases, parts are shipped right from stock.

A 1890-B

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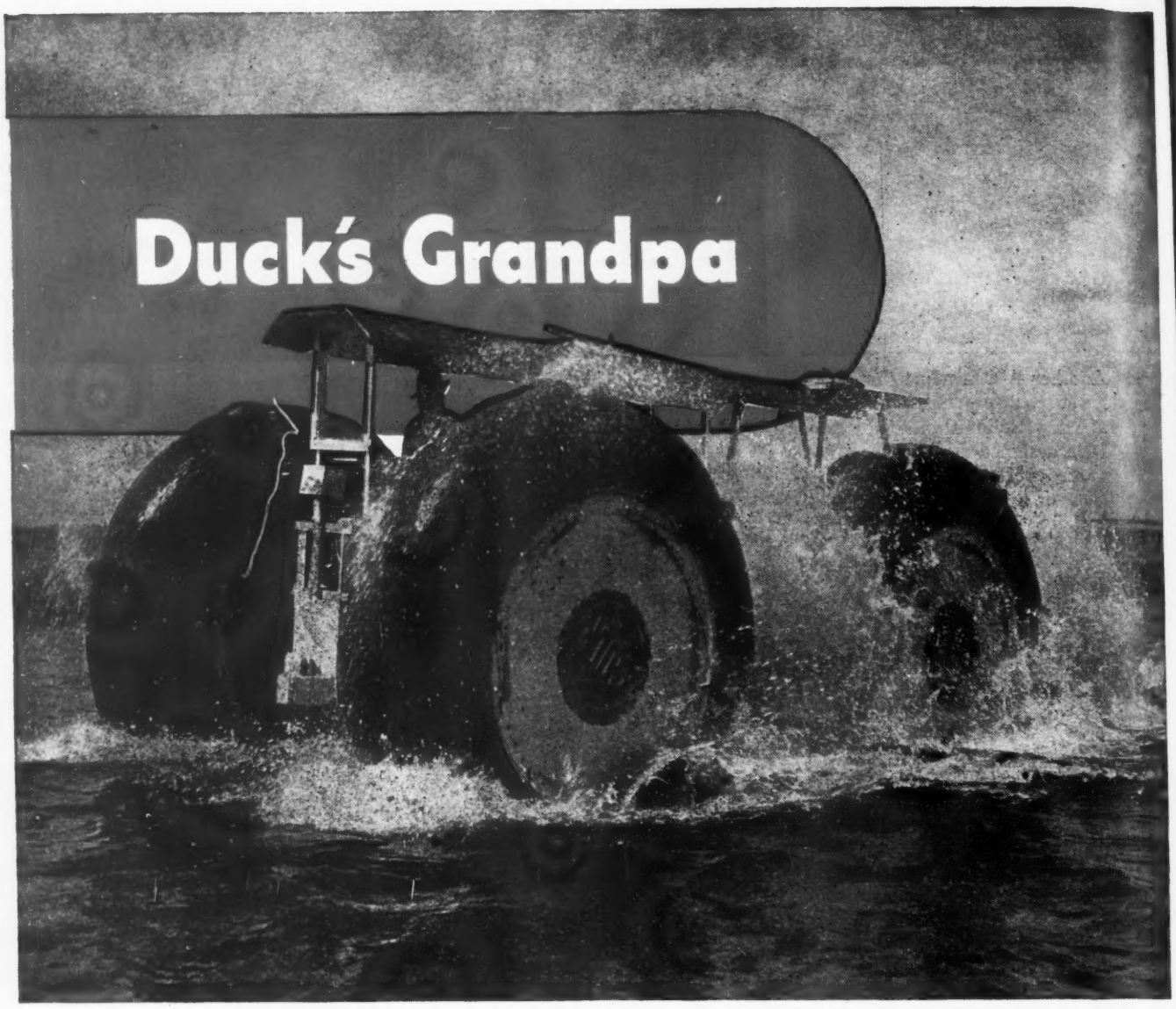

MEET the grandfather of today's "Ducks," "Weasels" and other amphibious military vehicles—born 10 years ago when Gulf Oil Corporation geophysicists decided to search for oil deposits in Florida and Louisiana swamps.

To get men and test instruments into that soft, gooey marshland, Gulf engineers, with Goodyear development men assisting on the tire-and-wheel plans, designed the vehicle you see above — a self-powered "marsh buggy" shod with big Goodyear balloon tires cross-strapped with lengths of hose that act as traction chains in mud, as paddles in water.

These big Goodyears support and move full loads over dry land and marshland — keep the buggy from sinking into mud and ooze. Equally important, they're sized and calculated for full flotation. More than 3 times larger than car tires, but carrying only 1/10 the air pressure, these big babies are motive water wings, too—buoyant enough to float the buggy and its load when deep water is encountered.

This example of job-engineering adds further proof of Goodyear's ability to build the right tire for any job. For construction work, Goodyear off-the-road tires are designed and built to meet the needs of special operations — the great Sure-Grip for drive wheels, the super-tough Hard Rock Lug for rock work, and the time-proved All-Weather Earth-Mover for general purpose vehicles.

And because these 3 big Goodyears deliver top performance and lower costs-per-ton-mile, they're first choice with cost-wise contractors everywhere. Why not buy — and specify — Goodyears on *your* units?

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Sure-Grip, All-Weather T. M.'s The Goodyear Tire & Rubber Company

Ask your Maintenance man

about *High Safety Factor* Electrical Insulation

Trouble-shooting maintenance men, whose primary jobs are to prevent shutdowns and to see that repairs make equipment as good as *or better* than new, will tell you that Fiberglas* Electrical Insulation Materials are the answer to many of their problems.

This better insulation material provides "extra" protection against the conditions which cause most motor burnouts. Impregnated Fiberglas has exceptional temperature, moisture and insulation resistance; high tensile, dielectric and impact strength; and an especially favorable space factor.

More and more design engineers, as well as maintenance men, are standardizing on Fiberglas-base Materials. They provide high *Safety Factor* insulation for electrical equipment which may be subjected to such hazards as heat, dirt, moisture, corrosive acids, overloads and careless handling or operation. These are the conditions which frequently cannot be anticipated by the manufacturer, yet are among the chief causes of heavy time-and-dollar loss in nearly every industry.

APPLICATION DATA

There is a Fiberglas-base Material to meet virtually every requirement. Performance and application data, as well as facts about the various types of Fiberglas Electrical Insulation Materials are included in catalog EL 44-7. Write for your copy today and ask for the name of the supplier located nearest to you. *Owens-Corning Fiberglas Corporation, 1862 Nicholas Building, Toledo 1, Ohio.*

In Canada, Fiberglas Canada Ltd., Oshawa, Ont.

ASK FOR FIBERGLAS...IN YOUR NEXT NEW MOTORS...AND ON YOUR NEXT REWIND

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*T. M. Reg. U. S. Pat. Off.

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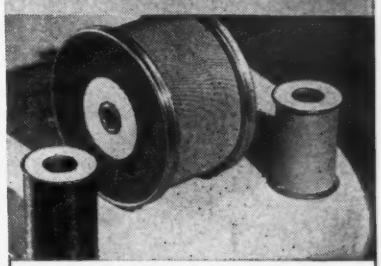
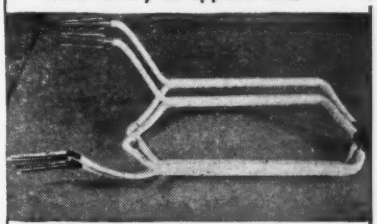
ELECTRICAL INSULATION MATERIALS

There is a FIBERGLAS Insulation Material for every need

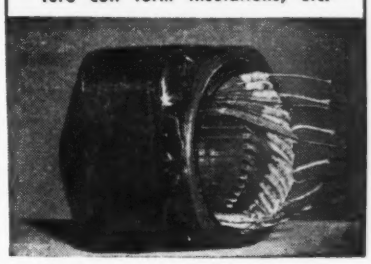


Fiberglas-insulated magnet wire in sizes from heavy # 0000 to fine # 42, and Fiberglas-insulated lead wires, both meet a wide variety of applications.



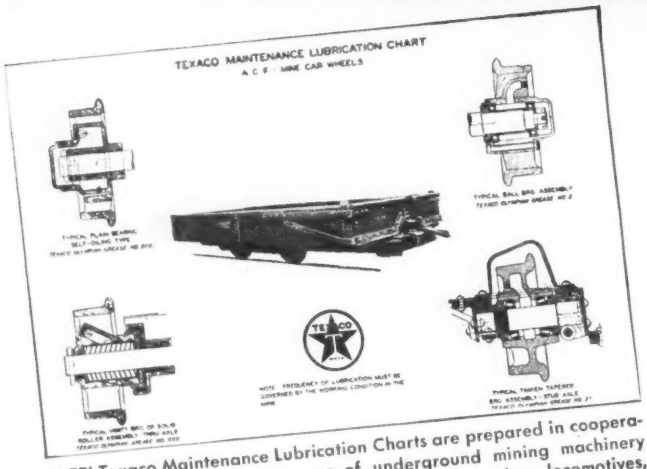
Treated or untreated Fiberglas Tape is used to insulate practically all sizes and types of coils.

Varnished Fiberglas Cloth is used for slot and phase insulation, high dielectric and high temperature coil form insulations, etc.



Fiberglas Treated Sleeving can be cut to short lengths without fraying. Single Saturated is also widely used on pigtail brush leads, leads on small armatures, single transformers, etc.

Write for catalog EL 44-7, today.



FREE! Texaco Maintenance Lubrication Charts are prepared in cooperation with leading manufacturers of underground mining machinery who approve Texaco products for use on cutters, loaders, locomotives, etc. Charts show clearly where and when to use the proper Texaco lubricant. Order the charts you need by make and model of each machine.

BECAUSE it has these essential qualities, *Texaco Olympian Grease* keeps mine car wheels ready to roll easily even at very low temperatures. Winter as well as summer, *Olympian* assures a minimum frictional drag. This not only makes for easier starting, but permits hauling longer trains and more tonnage with less power.

Texaco Olympian Grease — developed through The Texas Company's intimate

TEXACO

TEXACO LUBRICANTS

Start Mine Cars *EASIER* this Winter...

USE A GREASE THAT

- ★ Won't stiffen excessively when cold
- ★ Won't separate, or leak out

knowledge of coal mining requirements — is a compound containing a carefully refined, superior mineral oil. It is designed to stay in wheel cavities and bearings longer than other greases. Consequently, fewer applications are necessary, yet bearings get greater protection, require less service. Moreover, application is simple and quick because of the easy way *Olympian* handles in the grease gun, and goes into the bearings. You will find it equally effective for cutters, loaders and other equipment.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

☆ ☆ ☆

The Texas Company, *National Sales Division, Dept. C.,* 135 East 42nd Street, New York 17, N. Y.

For the Coal Mining Industry

11948

No time is lost at the face. Loading, drilling and cutting operations are carried on simultaneously. Tramming and car changes are not factors.

11965

The Duckbill readily loads rock and slate as well as coal. Here it is removing bottom slate in an entry to increase clearance.

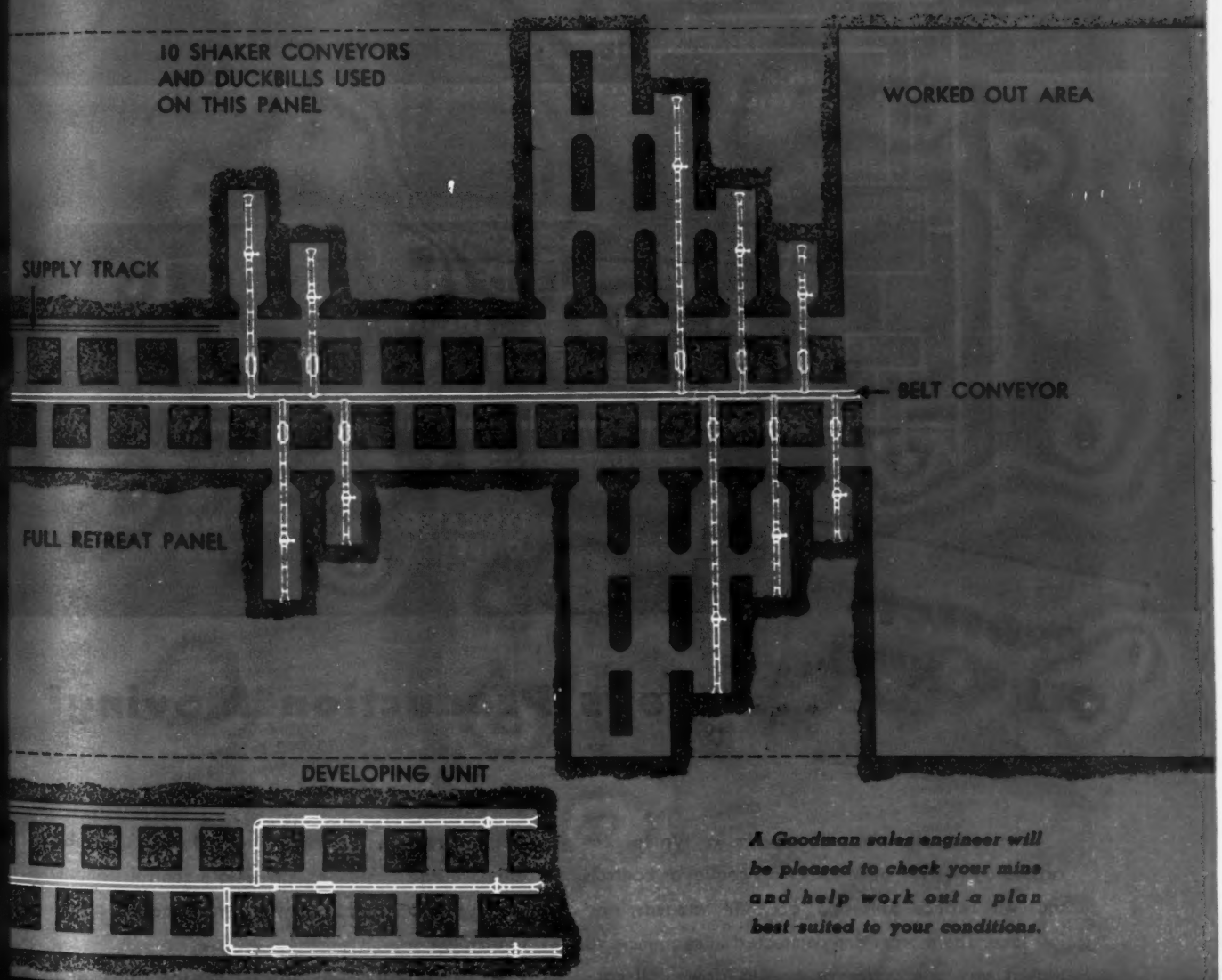
GOODMAN MANUFACTURING COMPANY

Locomotives • Loaders • Cutting

Combine Your Loading and Transporting

with the **GOODMAN DUCKBILL-SHAKER CONVEYOR SYSTEM OF MINING**

This multiple Duckbill-Shaker Conveyor system in rooms and entries, with discharge onto belts, is just one of many completely mechanized loading and gathering methods employed to accelerate production with *a continuous flow of coal from face to mine car.*

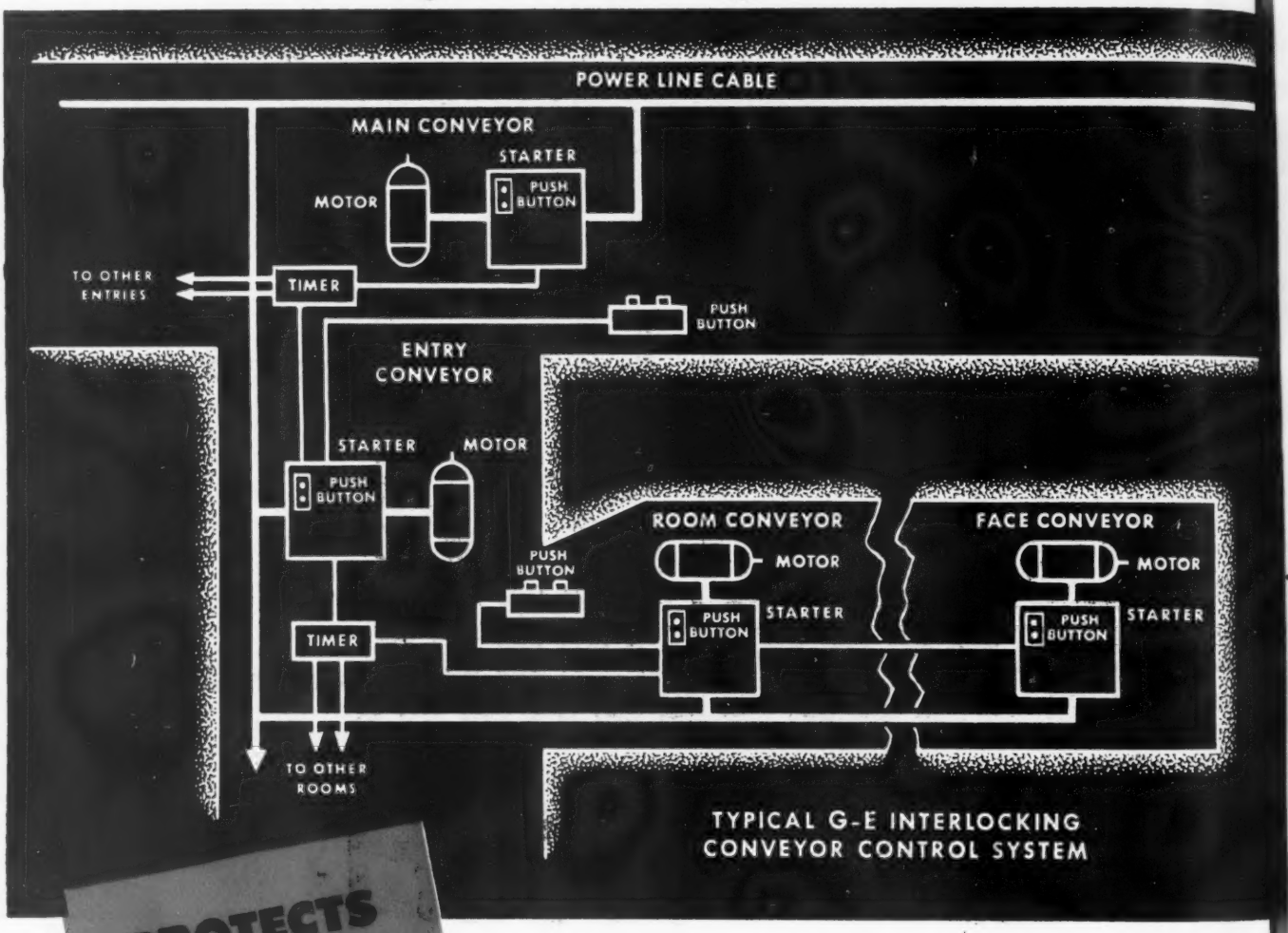


A Goodman sales engineer will be pleased to check your mine and help work out a plan best suited to your conditions.

HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS

Machines • Conveyors

MORE SAFETY for *Conveyor Operation*



PROTECTS PERSONNEL

. . . Keeps Production Moving!

This schematic diagram shows a typical co-ordinated system of interlocking conveyor controls that will reduce confusion, accident hazards, and lost time. The motors are connected in sequence, so that if any one conveyor breaks down, all contributing conveyors are automatically shut down, thereby preventing coal pile-ups. All motors are started by momentary contact push buttons. Once a conveyor has stopped, unexpected restarts are impossible until that particular conveyor's START button is pushed. Push-button stations can be either in the controller, at remote-control stations, or a combination of both, whichever is best adapted to efficient operation.

A prime cause of large voltage dips and momentary overloading of the power system has been the tendency of all motors in an interlocking system to start at the same time. In the G-E systems, sequence interlocking or timers so regulate motor-starting that the motors always restart one at a time.

New G-E interlocking conveyor controls for gassy mines

prevent { COAL PILE-UPS | UNEXPECTED RESTARTS | EXCESSIVE STARTING LOADS

NOW you can have safe, positive conveyor control that's co-ordinated "right down the line," from main conveyor to working face. And you can have it in gassy mines where permissible equipment is required.

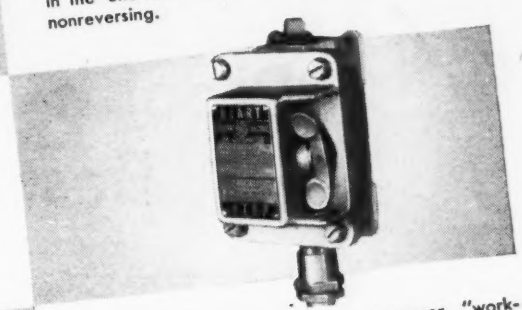
The diagram opposite shows a typical arrangement of G.E.'s new control equipment for gassy mines in a conveyor control system that is fully co-ordinated and truly automatic. With a system like this you can eliminate the hazards of dangerous coal pile-ups and unexpected motor restarts. You can avoid the excessive current peaks which occur when too many conveyor motors start at once.

G-E engineers have had wide experience in putting conveying systems on a safe, efficient basis. Rather than supply you with equipment only, their objective is to recommend a complete plan which insures full protection against common conveyor hazards. If you feel that your conveying system needs tighter control, why not talk it over with a G-E sales engineer soon? *General Electric Company, Schenectady 5, N. Y.*

EQUIPMENT FOR BM-INSPECTED MINES

Explosion-proof Starters—Recommended for gassy mines where permissible equipment is required. This starter is built to meet all the requirements of BM Schedule 2E. Available for a-c full-voltage, d-c reduced-voltage, or d-c full-voltage starting. All have a START-STOP push-button station in the enclosure cover, and can be reversing or nonreversing.

Push-button Stations—The G-E START-STOP, momentary-contact push button, either in the cover of the starter or remotely mounted, is made according to the requirements of BM Schedule 2E and provides undervoltage protection. Unexpected motor restarts which might cause injuries to operators are avoided because the START button must be pushed to restart the conveyor motor.

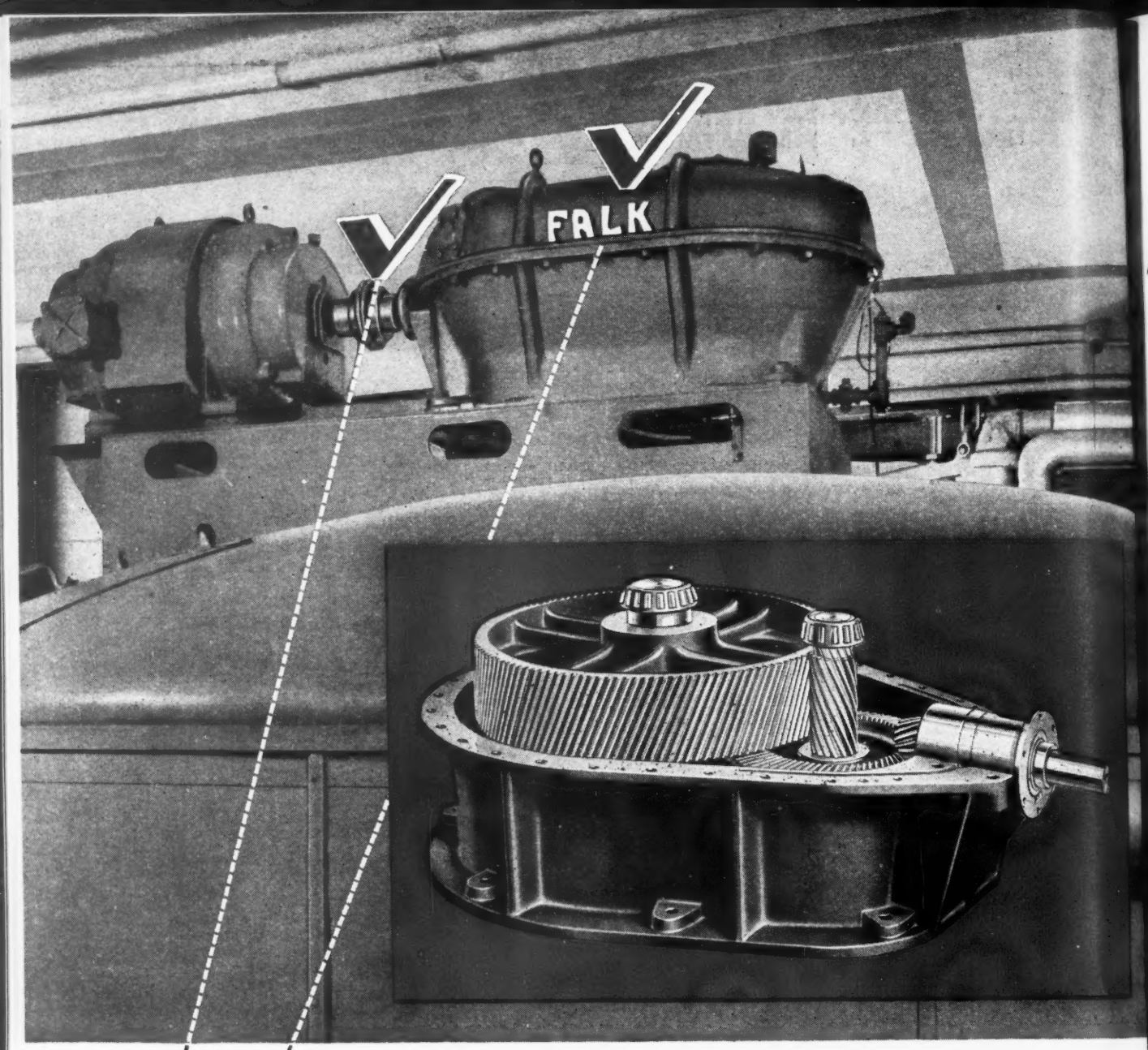


"BM" Motors—These sturdy conveyor "workhorses" meet all the design requirements of Bureau of Mines Schedule 2E. Their totally enclosed, fan-cooled construction effectively seals out dirt, dust, and dripping water, assuring long life and little maintenance. Available in all popular sizes and types to meet your mine requirements.

Buy all the BONDS you can—*and keep all you buy*

GENERAL ELECTRIC

657-44-148



This illustration shows a Falk Vertical Right Angle Speed Reducer and a Falk Steelflex Coupling as the power transmitting units operating an agitator drive in a large nationally known brewery. This combination of a Falk Steelflex Coupling and a Falk Speed Reducer is typical of many such installations throughout every industrial field.

Proof by Performance is the Best Proof of Worth

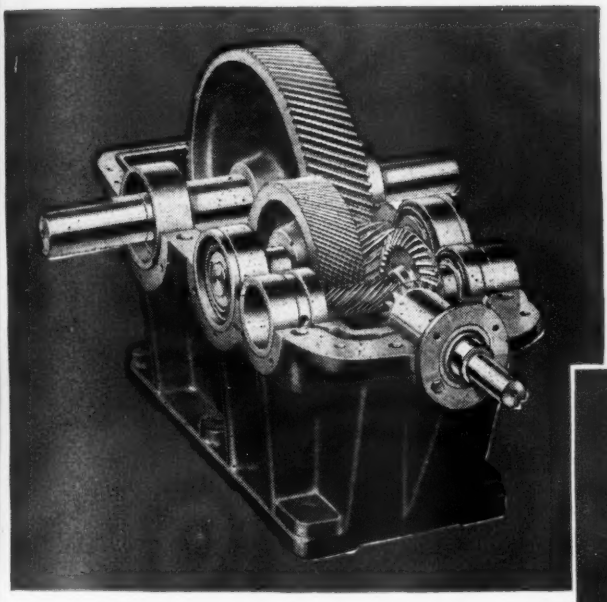
Words at their best can carry only a suggestion of the worth of a product... The final proof of worth—the best proof—is proof by actual performance in the field.

The field performance of Falk Speed Reducers reflects the unusual skills acquired by Falk engineers during their long years of experience in the manufacture of herringbone and single helical gears, and special high speed drives.

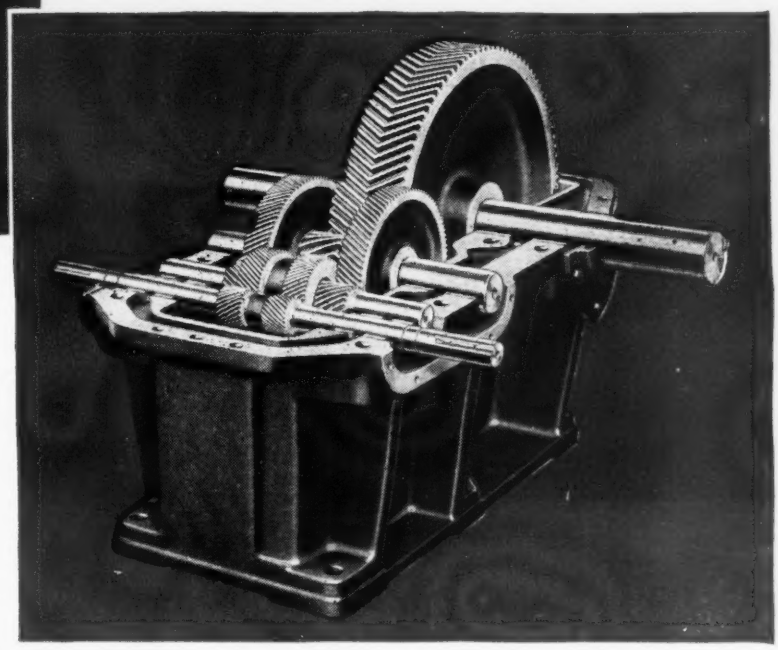
Case histories of Falk Speed Reducer performance in many segments of industry show continuous high efficiency, and extremely long life.

IT ALWAYS PAYS TO CONSULT **FALK**

Any Size... Any Service Requirement can be fully met with Falk Speed Reducers



Falk Speed Reducers are available in single, double, and triple reduction; in parallel shaft, horizontal right angle and vertical right angle types; in ranges from 0.13 H.P. to 2000 H.P.; in ratios from 1.5:1 to 5.28:1 to 52:1 to 515:1 . . . Available with either sleeve or roller bearings . . . All Falk Speed Reducers have a 100% excess capacity and peak efficiencies from 96% to 98½% depending upon the reduction . . . Symmetrical arrangement assures balanced performance . . . Patented system of lubrication and interchangeability of parts assure long life.



Left: Right angle Falk Speed Reducer with vertical low speed shaft. Available in single reduction units, 1.5:1 to 5.28:1; double reduction, 5.7:1 to 43.5:1; triple reduction, 52.1:1 to 430:1.

Above: Right angle speed reducer. Available in single reduction units, 1.15:1 to 5.28:1; double reduction, 5.7:1 to 52.1:1; triple reduction, 56:1 to 515:1.

Right: Parallel shaft, herringbone speed reducer. Ratios: single reduction, 1.5:1 to 10:1; double reduction, 11.5:1 to 70.2:1; triple reduction, 80:1 to 300:1.

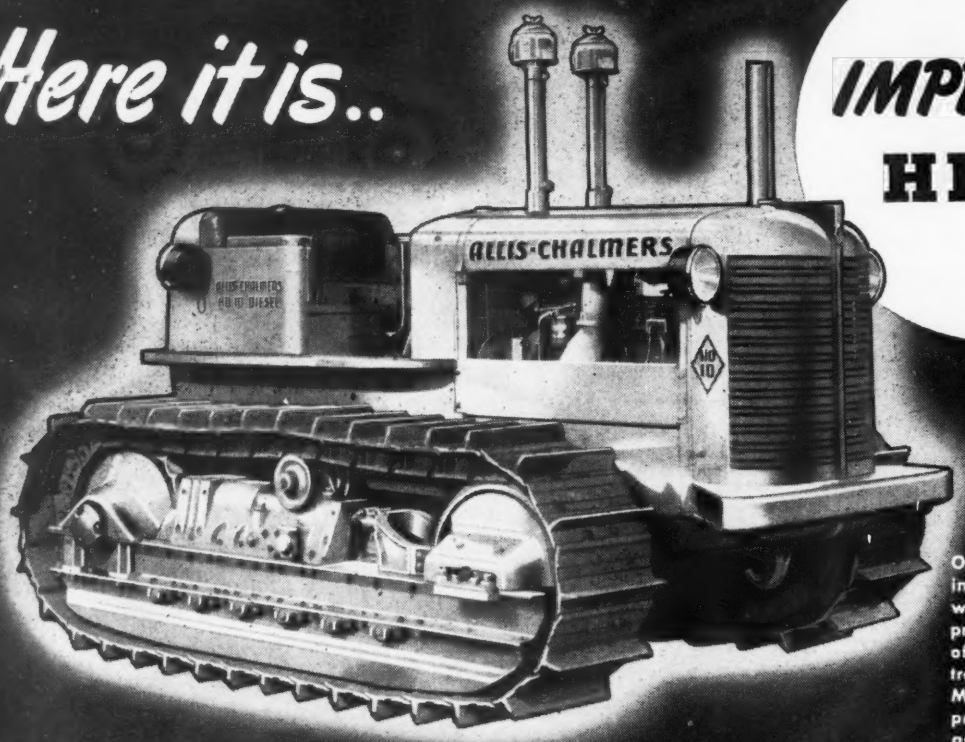
THE FALK CORPORATION, MILWAUKEE 8 WISCONSIN

For over fifty years precision manufacturers of Speed Reducers . . . Motoreducers . . . Flexible Couplings . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Contract Welding and Machine Work • District Offices, Representatives, or Distributors in principal cities.

FALK . . . A GOOD NAME IN INDUSTRY

Here it is..

IMPROVED HD-10



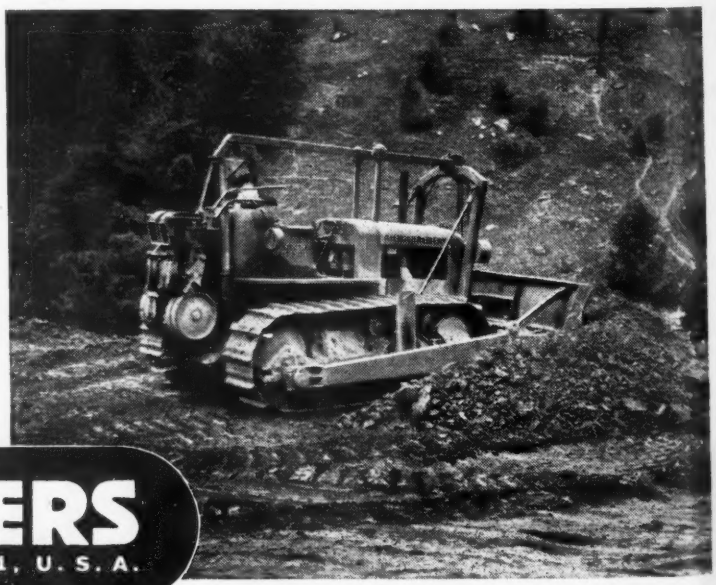
Over ten per cent increase in ground contact is gained with longer track . . . ground pressure reduced. Addition of a truck roller on each track reduces wear and tear. More tractor weight — approximately 860 pounds — assures better all-'round performance.

L·O·N·G·E·R T·R·A·C·K

A better performer than ever with extended track! More track on the ground means greater traction—more grip, more drawbar pull! Cuts scraper loading time, speeds bulldozing and hauling work . . . insures better footing on every type of soil. Operators will like its smoother, easier riding. Owners will welcome increased work capacity.

More good news . . . HD-10's are now more readily available to essential users. In case you have to wait temporarily . . . it will be well worth while waiting for the *improved* HD-10!

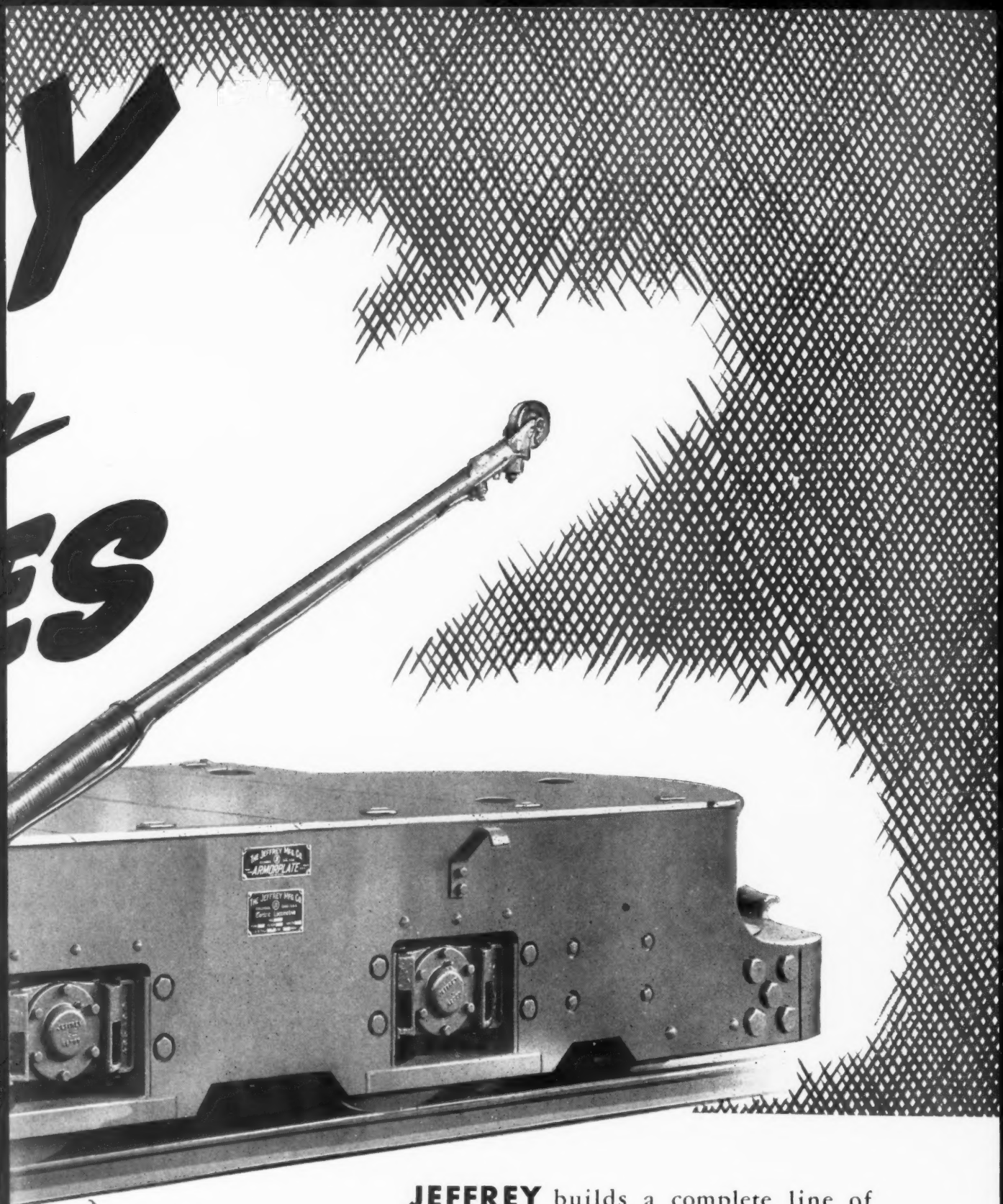
—Gives You { IMPROVED TRACTION
IMPROVED BALANCE
IMPROVED RIDING
IMPROVED PERFORMANCE!



ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

JEFFREY
Gathering
LOCOMOTIVES

trolley, ca
meet spec
pictured h
pension an
bearings c
of main-li



JEFFREY builds a complete line of trolley, cable reel and storage battery type locomotives to meet specific gathering needs and conditions. Locomotive pictured here is equipped with roller bearing motor axle suspension and roller bearing journal boxes. Where desired, bronze bearings can be furnished. Jeffrey also builds a complete line of main-line haulage locomotives in single and tandem units.

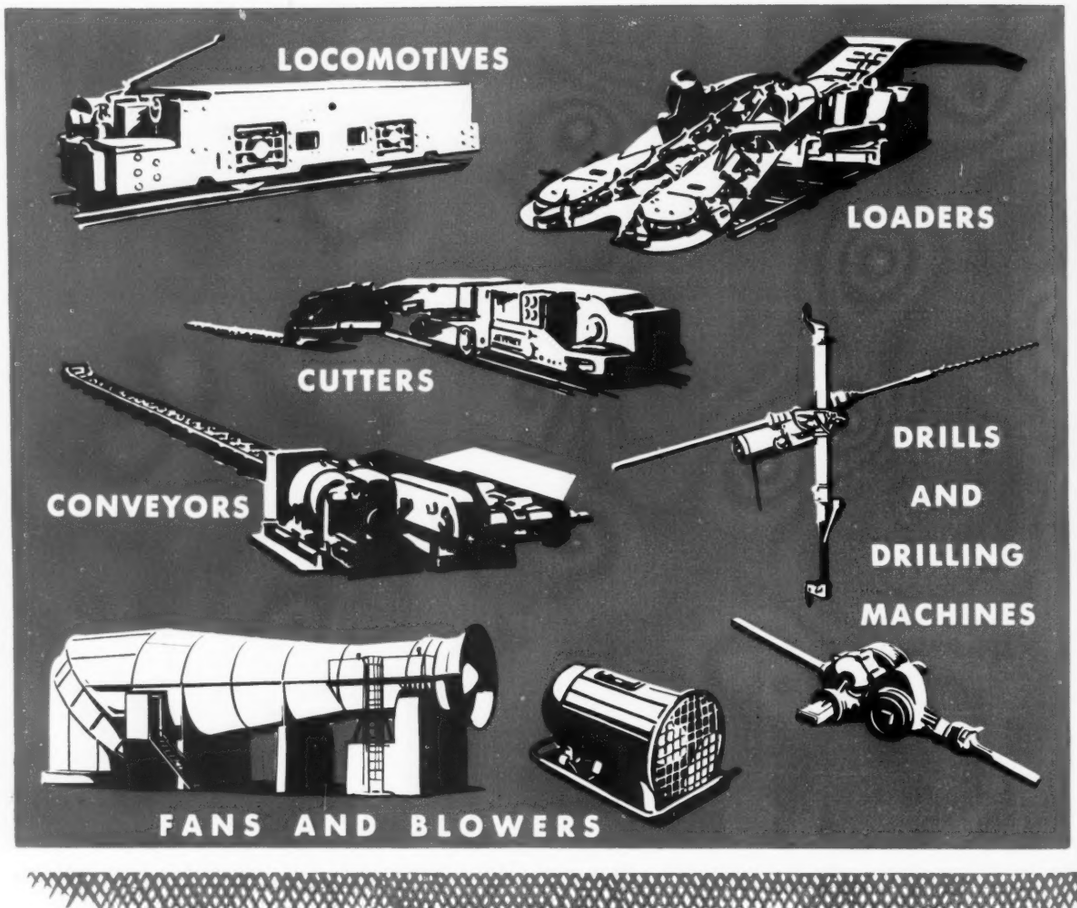
DID YOU KNOW?

That all of the 4½ million pounds of sulfa drugs produced in the United States last year came from Coal By-products?

That during the past six years two out of every three locomotives shipped by The Jeffrey Mfg. Co., were equipped with Roller Bearing Motor Axle Suspension ... a construction pioneered by Jeffrey?

Jeffrey
EQUIPMENT FOR COAL MINES

JEFFREY SERVICE TO THE COAL MINES MEANS SERVICE TO ALL INDUSTRY



THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices: Baltimore, Birmingham, Boston, Buffalo, Chicago, Cleveland, Cincinnati, Detroit, Denver, Harlan, Houston, Huntington, Milwaukee, New York, Philadelphia, Pittsburgh, Scranton, St. Louis, Salt Lake City

Service Stations: Pittsburgh, Harlan, Ky., Birmingham, St. Louis, Logan-Beckley, W. Va., Scranton

Foreign Plants: Jeffrey Mfg. Co., Ltd., Montreal, Quebec; British Jeffrey-Diamond, Ltd., Wakefield, England; Jeffrey-Galion (Pty), Ltd., Johannesburg, S. A.

Loaders "eat up" big lumps like these

Loader in action within two minutes of firing charge of "Monobel" AA in W. Va. mine. Six tons of large lump coal were loaded in 56 seconds!

Here's a New Permissible That Helps Get *More* Coal Out *Faster*

Du Pont "Monobel" AA is different. It's a new, powerful permissible that puts coal where it's needed for easier, more efficient loading, resulting in higher percentage recovery and minimum machine maintenance. It offers a welcome combination of coal-getting ability and water resistance.

"Monobel" AA makes firm, large lumps . . . it doesn't shatter the coal. Face and ribs are sheared clean and square . . . sometimes permitting reduction in the number of holes required.

In many mines, "Monobel" AA can handle any condition encountered . . . wet work, hard-shooting coal, rock or slate. It's an all-round powder that frequently replaces a combination of two or three other permissibles. Fumes are Class A . . . allowing quick return to the face.

Introduced little more than a year ago, "Monobel" AA has steadily increased in sales. Today, it is one of the "best selling" permissibles. Miners like it. Operators approve its time-saving characteristics. Ask your Du Pont Explosives representative about this new permissible, or write E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Del.

DU PONT

PERMISSIBLES

BLASTING SUPPLIES AND ACCESSORIES

DU PONT

REG. U. S. PAT. OFF.

LAY-SET'S GREEN-LUBE

• GREEN-LUBE *is a superior grade lubricant made to our own specifications. It clings to the wires longer—protects them better—enables them to give increased service.*

ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Bridgep

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

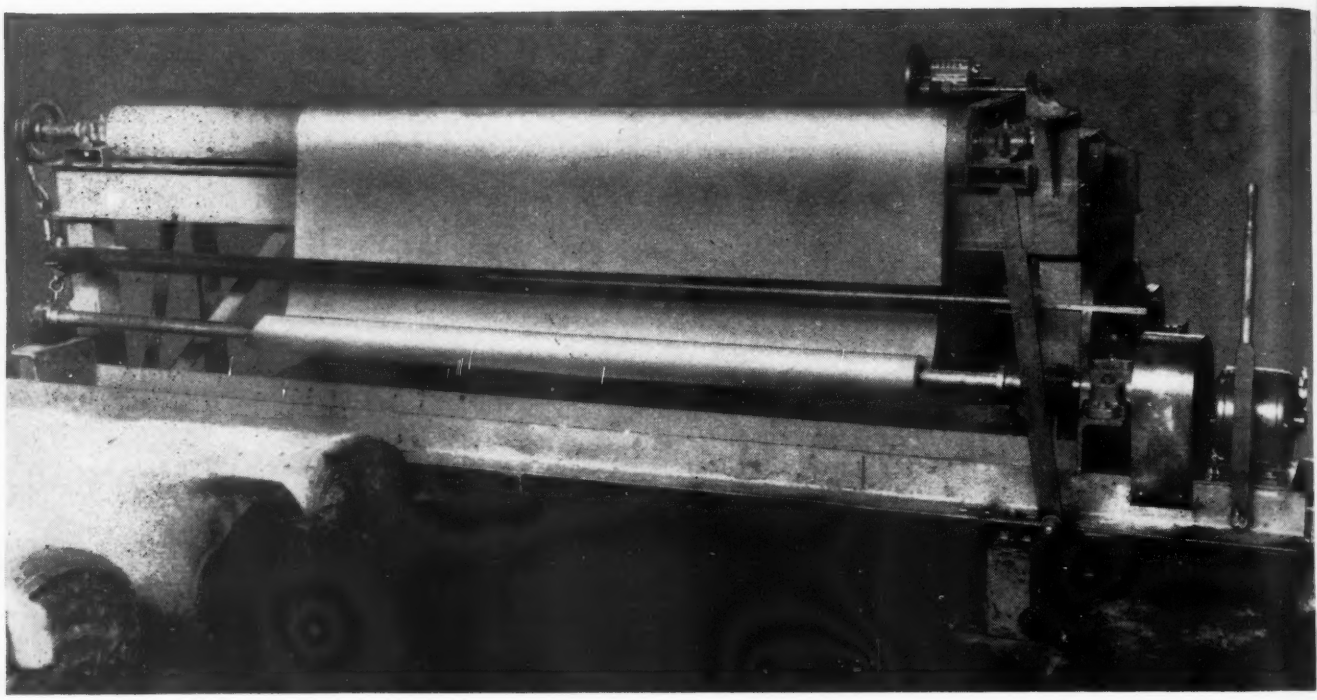
TRADE MARK

In Business for Your Safety

MAKES IT STILL BETTER

HAZARD'S All-Green rope is **LAY·SET** Preformed made of Improved Plow Steel — the best rope. Now this rope is *still better,* because it is completely protected with GREEN-LUBE *Every strand* is packed with our new superior green lubricant which gives added life to every wire. Not a single strand, not two strands, but every strand—yes, even every individual wire is completely covered by GREEN-LUBE The all-green color is an added protection to the highest grade rope made: **LAY·SET** Preformed I. P. S. Use only Hazard's All-Green rope.

One Reason Upson-Walton Brattice Cloth is Better Brattice Cloth



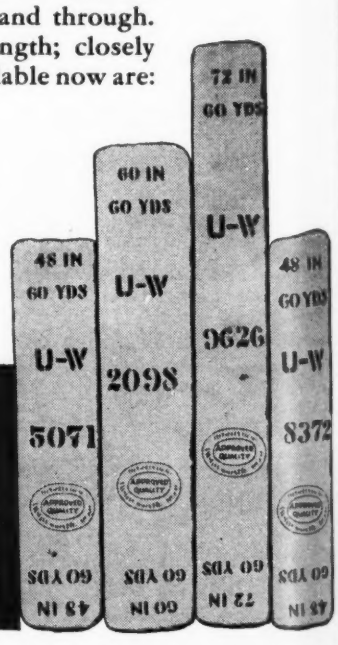
EVERY FIBRE GUARANTEED NON-INFLAMMABLE

ILLUSTRATED above is a new machine, designed by our own engineering department, to simplify and improve our production of quality brattice. *Every yard, every inch, every fibre* of the brattice that leaves this Upson-Walton rollometer is assured quality and guaranteed non-inflammable through and through. Made from long fibre twisted jute yarn for strength; closely woven to exclude gases and dust and retain air. Available now are:

UW 9626—medium weight, single warp cloth.

UW 8372—heaviest single warp cloth, for use where operating conditions are severe.

NOTE: UW 5071—medium heavy, single warp—and UW 2098—extra heavy double warp are now unavailable due to wartime restrictions. They will be returned to the Upson-Walton line just as soon as it is possible for us to make them.

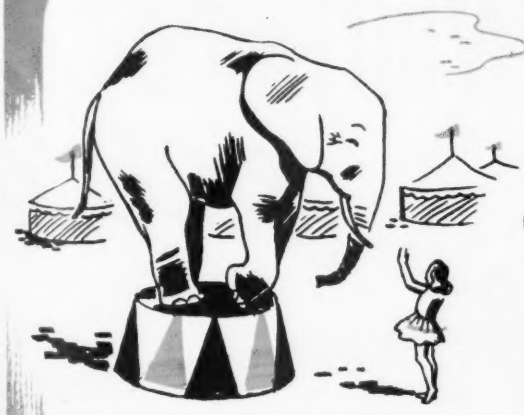


THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks

MAIN OFFICES AND FACTORY: CLEVELAND 13, OHIO

114 Broad Street, New York 4 · 737 West Jackson Boulevard, Chicago 6 · 241 Oliver Building, Pittsburgh 22



How to keep an Elephant happy—

Circus owners say an elephant works best when fed a well-balanced and ample diet. It's the same story with your loaders, cutters and other expensive face machinery . . . elephants for work in any man's language. Only when such equipment is fed an ample supply of uninterrupted power can it produce coal at top efficiency. If the best interests of mechanization are to be fostered, considerable thought should be given the feeder distribution system.

In planning such a system, two principles should be kept in mind . . .

1. Well-balanced circuits, using ample but not extravagent copper.

2. Properly suspended circuits protected against grounding and breakdown.

For the best method of suspending mine feeder circuits, standardize on O-B Bulldog Feeder Slings. They may be used in countless combinations, a few of which are illustrated here. Put O-B Bulldogs to work on your feeder system and make certain your face "elephants" are getting their proper diet . . . a steady flow of electrical power.

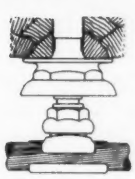
Ohio Brass

MANSFIELD, OHIO

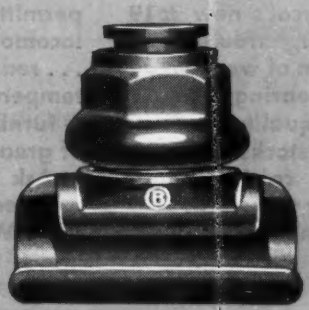
Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

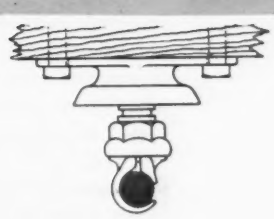
2568M

5 WAYS TO USE O-B BULLDOG FEEDER SLINGS

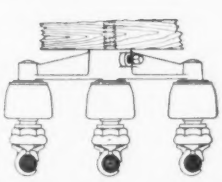


To suspend feeder from mine roof using suspension bolt and K-3 Hanger. May also be installed horizontally.

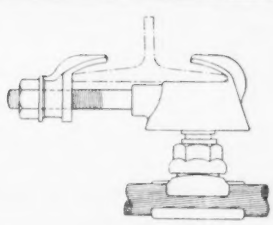




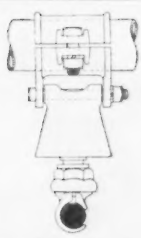
To attach feeder to timber using Type H-3 Hanger. May be installed vertically or horizontally.



To suspend three feeders side by side from triple yoke.

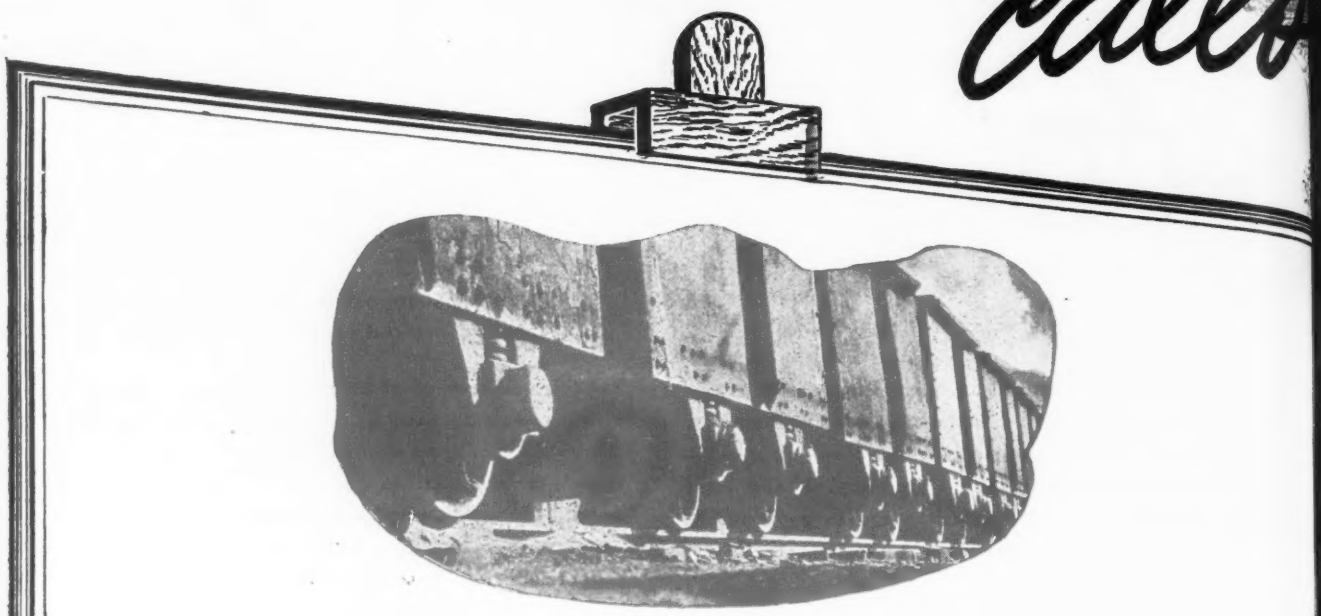


To suspend feeder from I-beams using I-beam Hanger.



To suspend feeder from pipe construction using Type N Swiveled Pole Bracket Hanger.

Today's Production Whirlwind calls



TYCOL #19 GREASE

...the modern lubricant for mine cars

In and out of the mine . . . under all weather conditions . . . Tycol's new #19 Grease assures efficient, trouble-free operation, with a minimum of wear on all types of mine car wheel bearings.

Tycol #19 Grease is a quality product, engineered from selected stocks of petroleum lubricating oil and calcium soap, expertly blended together to assure: —

. . . elimination of low temperature drag, definitely lowering power requirements, permitting more cars to be hauled by one locomotive.

. . . reduction of lubricant leakage at high temperatures so that less grease is needed — furnishing lower output costs per pound of grease.

Ask to have a Tide Water Associated engineer explain the full benefits of Tycol #19. Write today.

INDUSTRIAL TYCOL OILS

TYCOL INDUSTRIAL

ENGINEERED FOR EVERY

for TYCOL
ENGINEERED LUBRICATION

Now more than ever before it is essential to use the best lubricants that can be obtained — for maximum production . . . top efficiency . . . lowest operating cost. That's why more and more operators are turning to Tycol scientifically engineered oils and greases.

Whatever your lubricating need — for mine car or tipple, textile loom or spindle, stationary Diesel or locomotive, steam engine or turbine . . . for extreme pressure, high or low temperature, heavy duty, high speed, or any other service condition — there's a Tycol oil or grease exactly suited to your specific need.

In developing this comprehensive line, Tycol subjects each individual oil and grease to rigid tests during manufacture. This control assures the required lubrication characteristics for maximum performance of that particular product.

Let us prove Tycol Engineered Lubrication efficiency to you . . . show you the extra value in every measure of Tycol oil and grease. Write your nearest Tide Water Associated office for the facts.

***SPECIFIC GRAVITY.** Clear, concise descriptions of the basic tests used to determine important lubrication properties — Carbon Residue, Pour Points, Specific Gravity and others — are given in Tide Water Associated "Lubricania". For your FREE copy write: Tide Water Associated Oil Company, 17 Battery Place, New York 4, N. Y.

UBRICANTS
RVICE NEED

TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N. Y.

PRINCIPAL OFFICES
BOSTON · PHILADELPHIA
PITTSBURGH · CHARLOTTE, N. C.

Airco Processes Help Break

MEETING the heaviest demands in their history in the face of the most serious manpower shortage and most stringent restrictions on production of equipment and replacements called for the greatest ingenuity on the part of mining men.

Modern Airco oxyacetylene and electric arc processes described on these pages played an important part in the industry's miraculous accomplishments. They helped to restore worn and obsolete equipment to use and to build new equipment not obtainable from war-converted suppliers.

So helpful have these processes proved that they will, no doubt, play an important part in future mining operations.

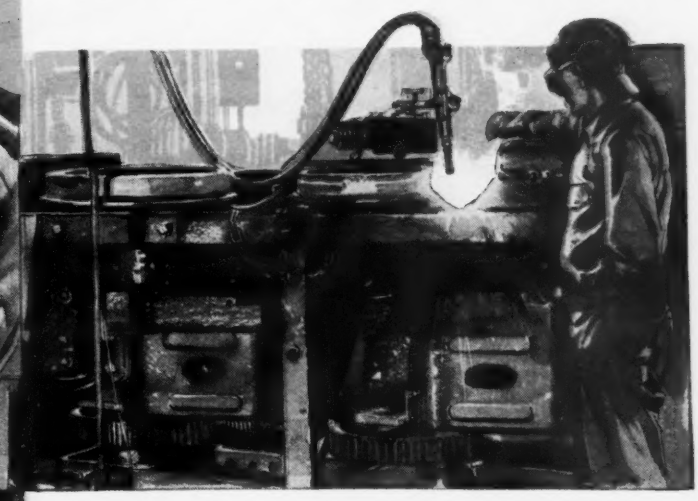
If you are unfamiliar with any of the applications listed in this advertisement, Airco's Applied Engineering Department will be glad to furnish complete information and assist you in applying them to your own operations.

Electric Arc Welding. Airco's famous "Hornet" and "Wasp" D.C. Arc Welders and "Bumblebee" A.C. Welders serve many of America's mines in building up and restoring locomotive tires (illustrated), loading machine truck wheels, rock crusher heads, etc. They are also widely used for rail bonding, equipment repairs, general fabrication and structural welding.

AIRCO

Mine Production Records

Gas Welding and Brazing. Oxyacetylene gas welding and brazing have proved their worth in restoring to service broken parts such as the drive pinion (illustrated) when replacement has been difficult or impossible. Gas welding and brazing have also proved important aids in the construction of equipment and parts.



Machine Gas Cutting serves many purposes on mine properties. In the illustration, false and sharp flanges are quickly removed from mine locomotive wheels. With a special set up, Airco cutting machines are also used in trimming worn rails. Airco Radiagraph portable cutting machines are also useful for accurately cutting steel plate for applications such as car body repairs, car and locomotive parts, etc.

Hand Flame Cutting quickly restores worn equipment to service by speeding the removal of damaged parts. It is also useful for many small or occasional cutting jobs, for dismantling steel structures and for preparing scrap for shipment to the mills.

OTHER AIRCO OXYACETYLENE AND ELECTRIC ARC PROCESSES SERVING THE MINING INDUSTRY

- Flame Cleaning of Steel Surfaces
- Flame Hardening
- Flame Heating for Straightening or Bending
- Oxygen Lancing
- Low Temperature Brazing
- Pipe Welding (Gas and Arc)
- Structural Welding
- Rail Bonding

Hardfacing — the application of special alloys to wearing surfaces by the electric arc or oxyacetylene process—restores the usefulness and multiplies service life of many types of mining equipment such as drill bits, clam-shell and dipper bucket edges, crusher parts, etc.

AIR REDUCTION

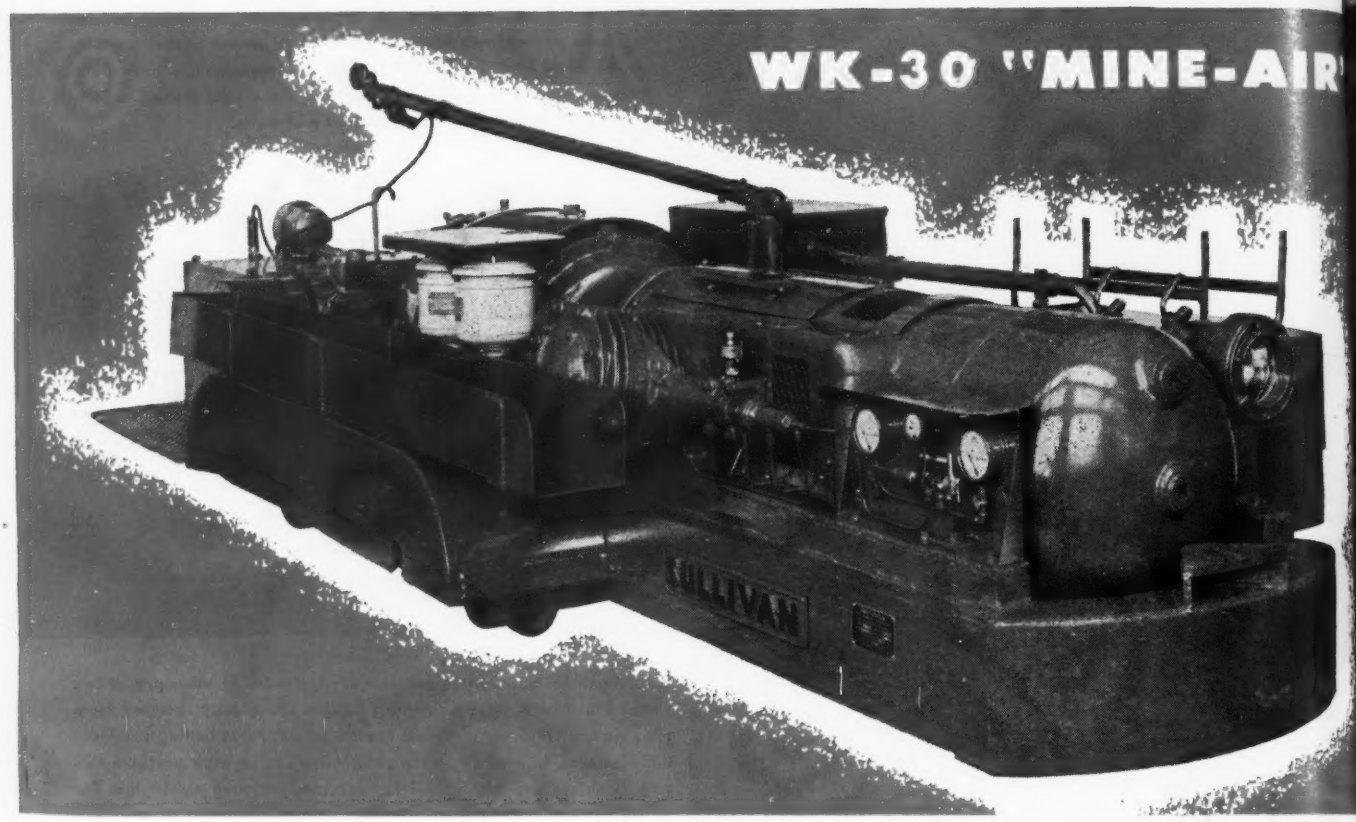
General Offices: 60 E. 42nd STREET, NEW YORK 17, N.Y.

In Texas: MAGNOLIA AIRCO GAS PRODUCTS CO. • General Offices: HOUSTON 1, TEXAS

Offices in all Principal Cities

Represented Internationally by Airco Export Corporation

MODERN AIR COMPRESSORS



★ Here's the DeLuxe Sullivan mine car compressor—self-propelled, completely enclosed, two-stage, fully automatic. It's a typical example of the modern design and engineering skill built into every piece of Sullivan equipment. The WK-30 is making an outstanding record for dependability, efficiency, and performance in modern mines everywhere. For details on the WK-30 and other labor-saving, profit-making coal mining equipment see your nearest Sullivan office.

WK-30 DATA

Air-cooled cylinders and intercooler require no water connections. Built-in cable reel holds 500 ft. of No. 4 cable for supplying power when tracks are extended beyond trolley lines. Actual free air delivery is 120 C.F.M. at 100 lbs. pressure. Track gauge is 42 inches and over.

SULLIVAN MACHINERY CO. MICHIGAN CITY, INDIANA

In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario

SALES OFFICES IN: Birmingham, Ala. - Butte, Mont. - Chicago, Ill. - Dallas, Texas - Denver, Colo. - El Paso, Texas - Huntington, W. Va. - Knoxville, Tenn. - Middlesboro, Ky. - New York, N. Y. - Pittsburgh, Pa. - Seattle, Wash. - San Francisco, Calif. - Salt Lake City, Utah - Scranton, Pa. - St. Louis, Mo. - Johannesburg, So. Africa - Sydney, Australia - Grantham Lincs, England

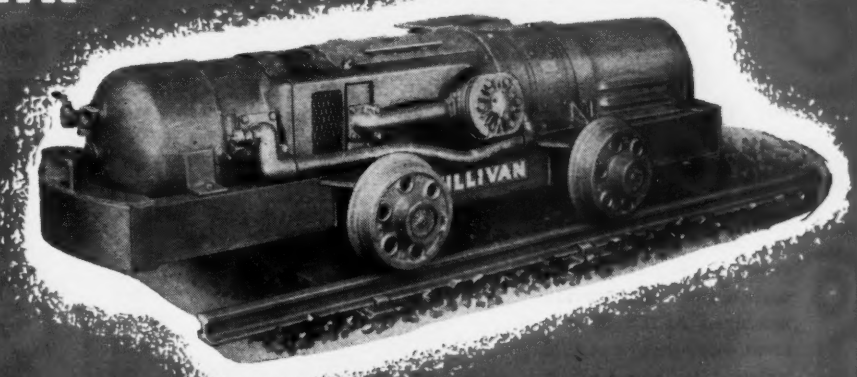
SULL

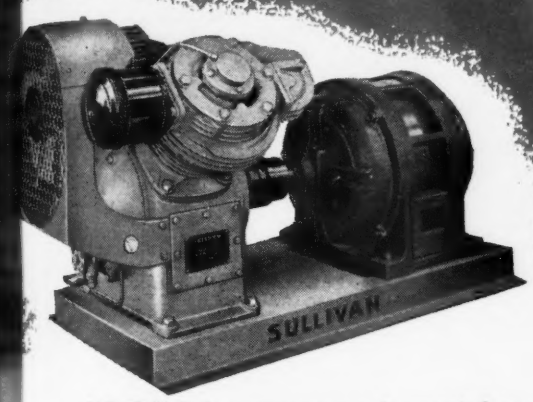
- a world-wide organization.

OR MODERN COAL MINES

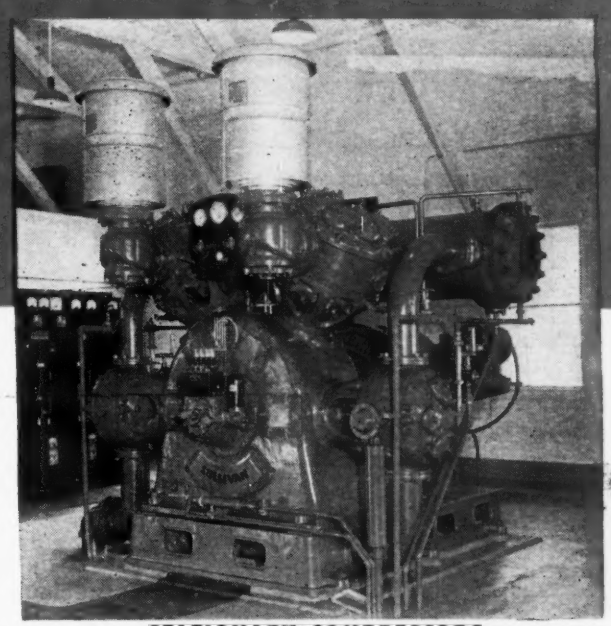
WK-29 "MINE-AIR"

Sullivan WK-29 is a single-acting, two-ge, air-cooled mine car compressor mounted its own frame and wheels. It is a complete, amlined unit similar to the WK-30 with the eption that it is non-self-propelled and has cable reel or trolley. Panel mounted con-s and automatic regulation are standard on models. Offered in two sizes delivering ner 85 or 120 C.F.M. at 100 lbs. pressure. ck gauge is 36 inches and over.





WL-70 Unitair compressor can be mounted on any standard mine car to make a dependable, mobile source of air power for use in mines where air demand is small (or for supplementary equipment). Completely air-cooled. Three models deliver 96 to 144 C.F.M. at 100 lbs. pressure.



STATIONARY COMPRESSORS

Sullivan makes a complete line of stationary compressors from 1/4 to 3,000 H.P. for other air demands. Model shown is a Sullivan WN-114 two-stage, double-acting, heavy duty air compressor.

SULLIVAN HAND-HELD ROCK DRILLS

Sullivan hand-held rock drills have established unequalled records for footage drilled, for economy of air consumption, for marked reduction in maintenance costs, and for dependable service. Unit shown is L-1 30-lb. hand-held drill for shallow holes. Models are also made in 35, 45, 55 and 65-lb. classes to fit your needs exactly.

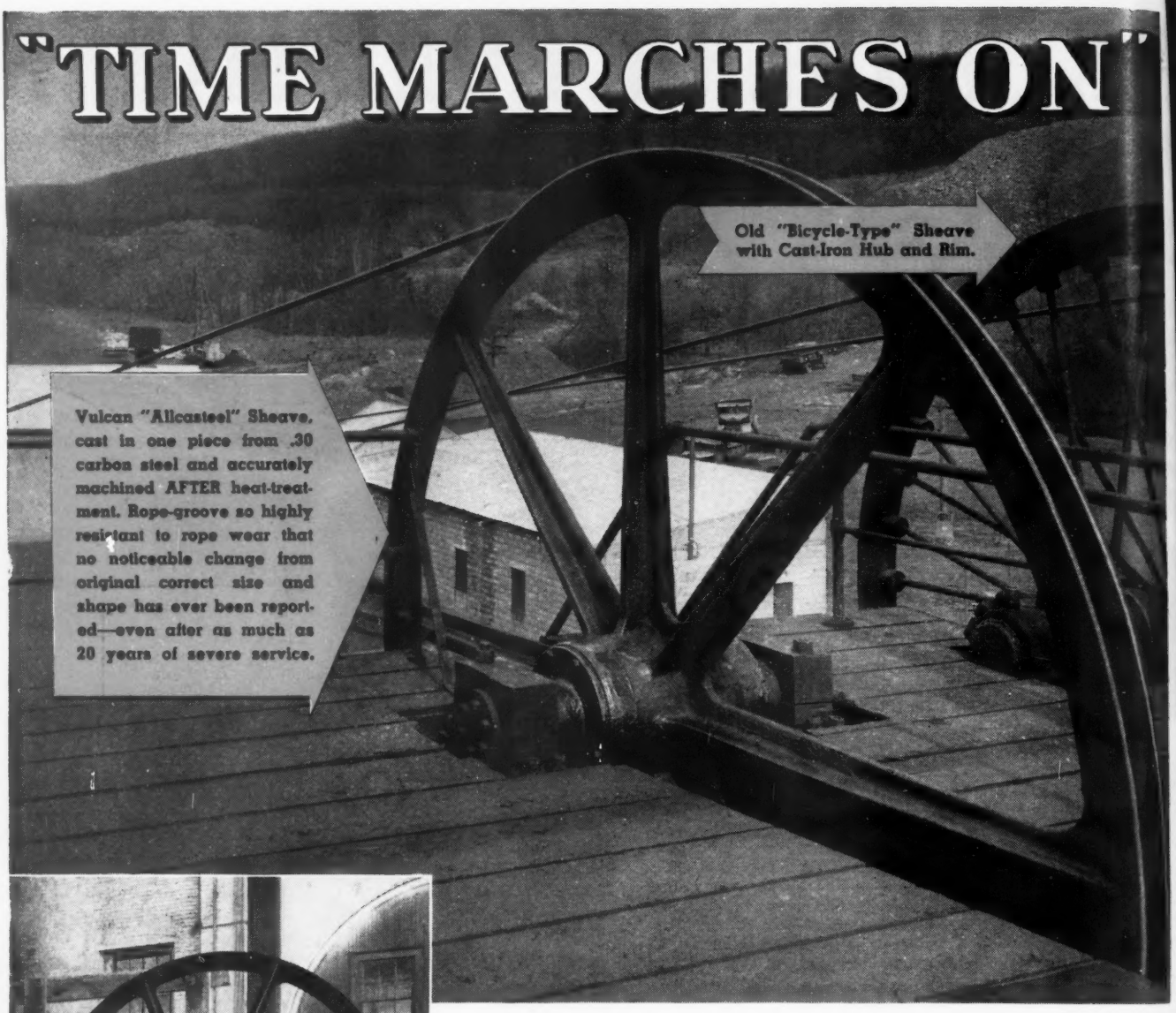
PRODUCTS:

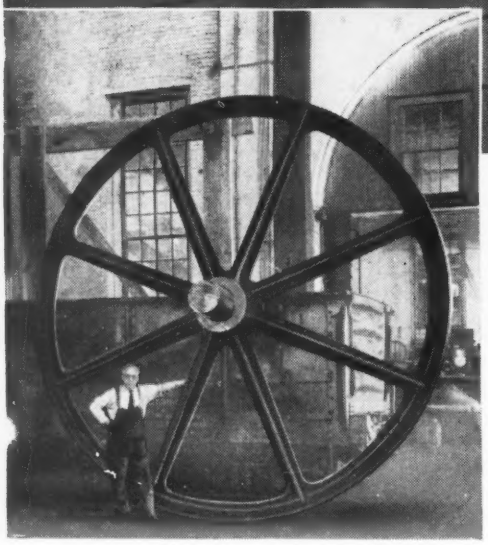
Coal Mining Machines - Slushers - Rock Loaders
Hoists - Car Pullers - Air Compressors - Coal Drills
Rock Drills - Cutter Bit Sharpeners and Heaters
Core Drills and Contract Core Drilling

IVAN

...established 1851 -

"TIME MARCHES ON"


Old "Bicycle-Type" Sheave with Cast-Iron Hub and Rim.
Vulcan "Allcasteel" Sheave, cast in one piece from .30 carbon steel and accurately machined AFTER heat-treatment. Rope-groove so highly resistant to rope wear that no noticeable change from original correct size and shape has ever been reported—even after as much as 20 years of severe service.



One of the six 14-ft. diameter Vulcan Allcasteel Sheaves recently furnished to a large metal-mining company.

MINING men are usually ultra-conservative—probably because precious lives so often depend upon the accuracy of their decisions. But "time marches on" and improved equipment gradually wins acceptance on its demonstrated merit.

Acceptance of Vulcan Allcasteel Sheaves came slowly at first but has gained momentum so consistently that our list of "Repeat" users now includes a large percentage of the leading companies in both the coal and metal mining fields. Light, strong and highly resistant to rope wear, they have thoroughly proved their money-saving superiority for every type of heavy-duty service. Available in any size—for either vertical or horizontal mounting—with either plain or anti-friction bearings.

VULCAN IRON WORKS

Established 1849

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church St.

Heavy-Duty Electric Hoists
Self-Contained Hoists
Scraper Hoists
Car-Spotting Hoists
Room Hoists

Shaking-Chute Conveyors
Chain Conveyors
Cast-Steel Sheaves and Gears
Cages, Skips and Gunboats
Coal-Preparation Equipment

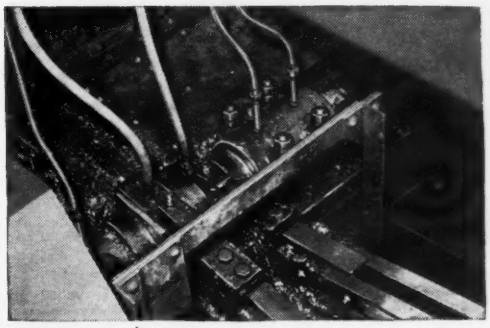
Steam Locomotives
Diesel Locomotives geared and electric drive
Gasoline Locomotives geared and electric drive

Load-Carrying Larries
Rotary Kilns, Coolers and Dryers
Crushing Rolls and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills

LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

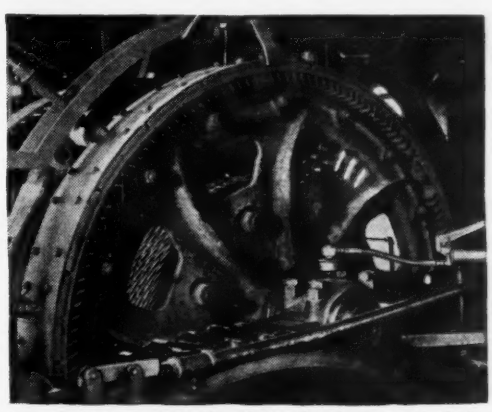
LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . . LUBRICATION ENGINEERING . . .

To help keep war weary equipment going until it can be replaced



Overheating and throw-off of lubricant from screen eccentrics has frequently been stopped by the right grade of Superla Grease recommended by a Standard Oil Lubrication Engineer.

A grease developed to handle easily in grease guns makes lubricating conveyor bearings faster and reduces wear.



Superla Grease also reduced over-heating on main hoist drum bearings in a stripping shovel and eliminated shut-downs for cooling off.

THE WARTIME PROBLEM of "making things do" may be with us for some time to come. And your problem of supplying this winter's needs and building up coal stocks is as great as ever.

Better lubrication can help you in both cases. A change in lubricants may enable you to keep worn cars, loaders, cutters and coal preparation equipment on the job until replacements can be made. New lubricating schedules may cut down-time for both lubrication and maintenance.

A Standard Oil Lubrication Engineer will have suggestions gained from working on similar problems with other operators. He has a line of mine lubricants for every possible preparation and equipment condition.

Let one of these Engineers help you now during this postwar period when "making things do" is still the order of the day. Write Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill., for the Engineer nearest you.

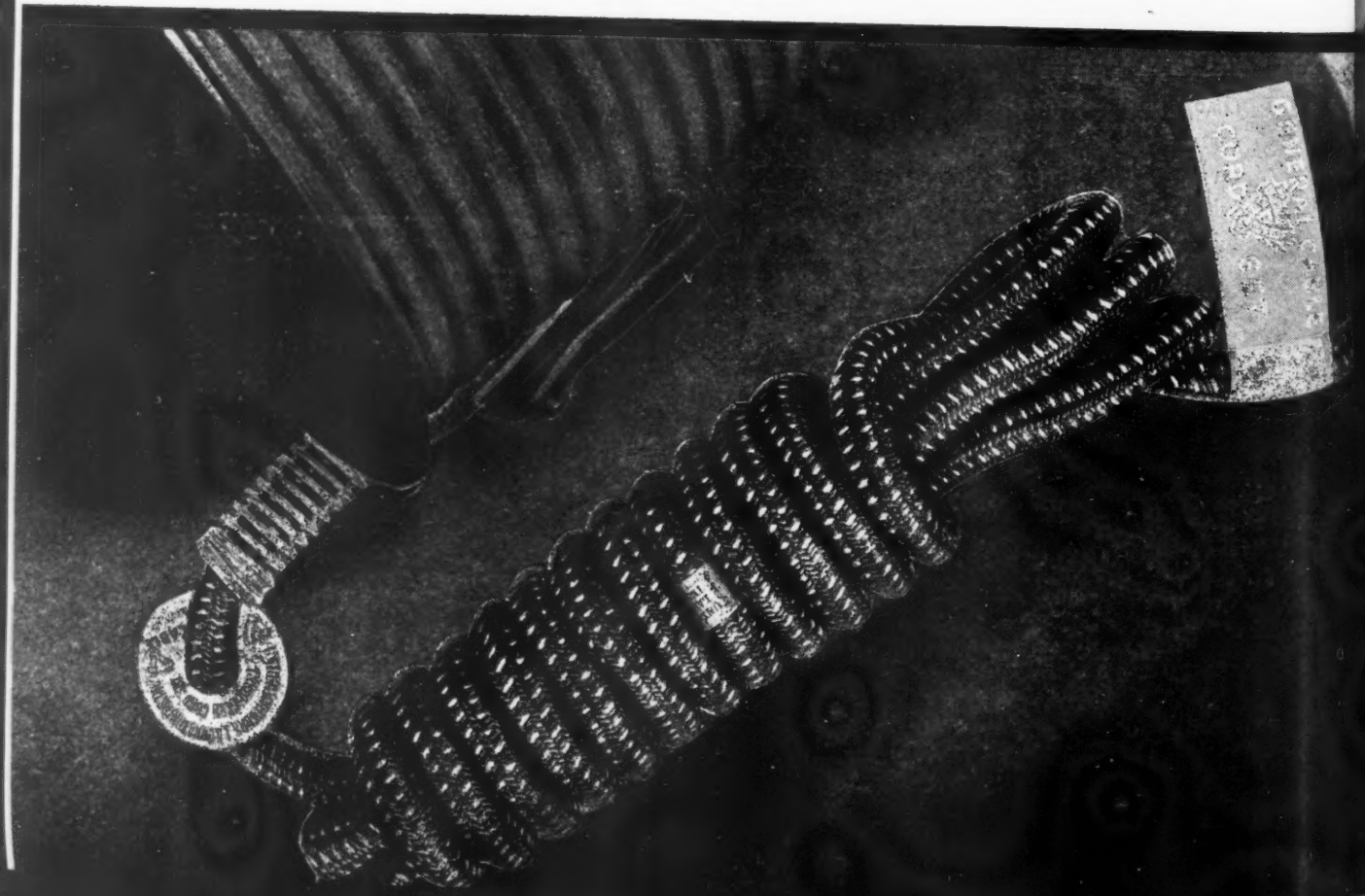
Buy and hold more Victory Bonds

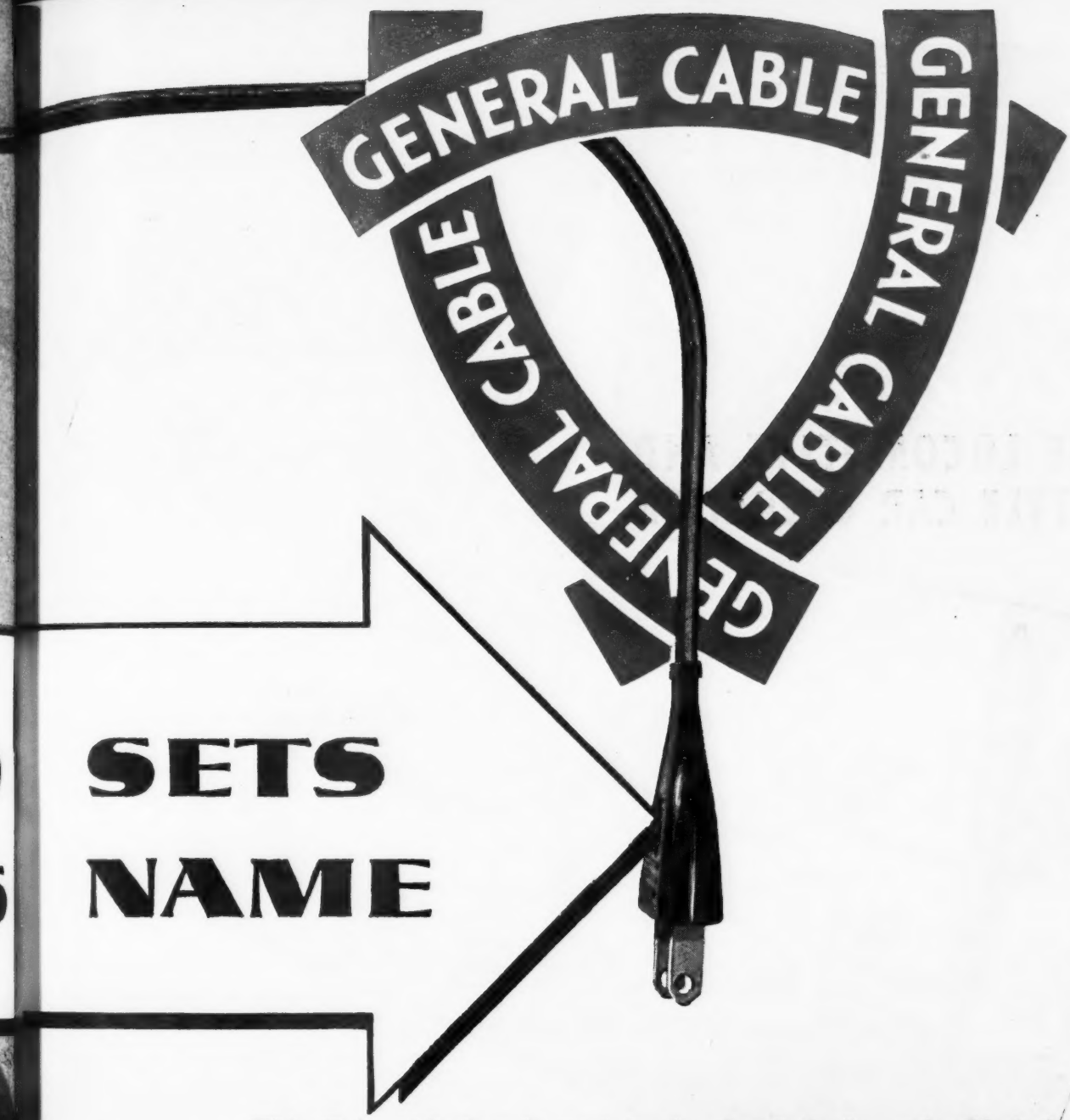
STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ LUBRICATION ENGINEERING

Again

CORDS AND CORD WITH THIS FAMOUS





SETS
NAME

This distinguished trade mark in the electrical wire and cable industry is once again the hallmark of quality on Cords and Cord Sets.

General Cable research and advanced engineering, plus expanded facilities and war-developed techniques have been adapted to the production of cords and sets that represent entirely new standards of quality and value.

Whatever your requirements may be, General Cable is now ready to serve you with a complete line of quality cords and cord sets.

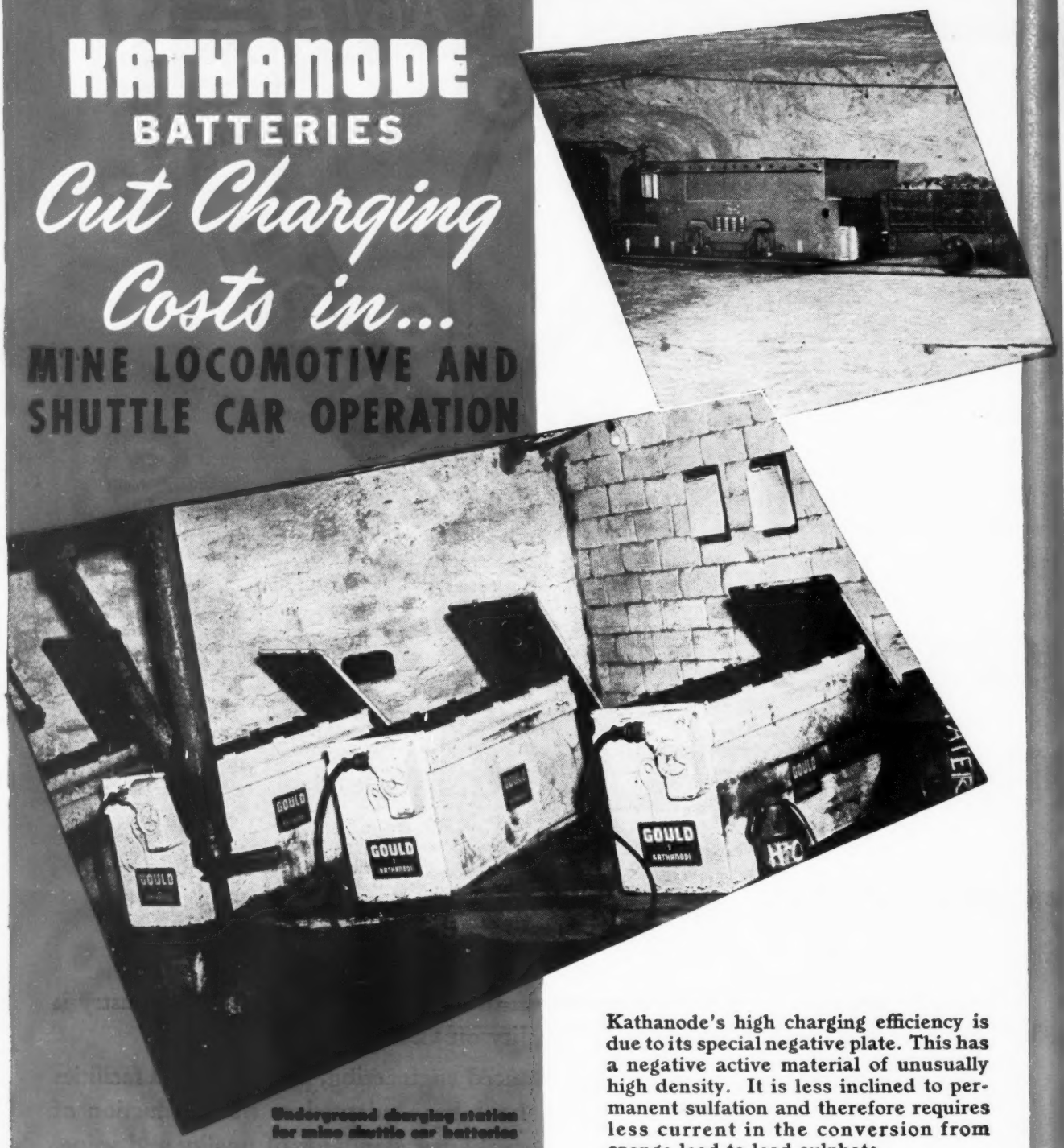
GENERAL CABLE
CORPORATION

General Cable Corporation Sales Offices are located at Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Kansas City (Mo.), Los Angeles, New York, Philadelphia, Pittsburgh, Rome (N.Y.), St. Louis, San Francisco, Seattle, Washington (D. C.)

KATHANODE BATTERIES

Cut Charging Costs in...

MINE LOCOMOTIVE AND SHUTTLE CAR OPERATION



Underground charging station for mine shuttle car batteries

Kathanode's high charging efficiency is due to its special negative plate. This has a negative active material of unusually high density. It is less inclined to permanent sulfation and therefore requires less current in the conversion from sponge lead to lead sulphate.

In mine locomotive and shuttle car service this more efficient utilization of charged current means lower charging costs and ability to handle heavy loads right up to the end of each shift. Kathanode batteries will do this through their entire service life.

Write Dept. 1011 for Gould Glassklad Battery Catalogs: 200 for Mine Locomotive Service and 300 for Mine Shuttle Car Service.

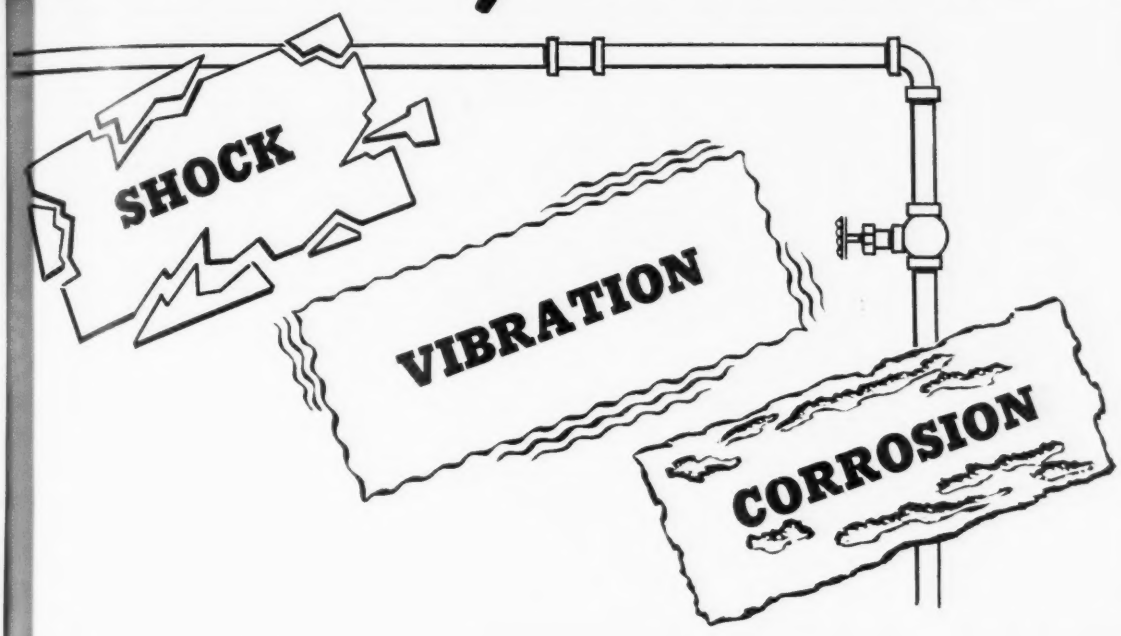
GOULD

PIONEER OF GLASSKLAD CONSTRUCTION

GOULD STORAGE BATTERY CORPORATION, Depew, N. Y.

Factories: Atlanta • Chicago • Dallas • Depew • Leavenworth • Los Angeles
North Bergen • Rock Island • St. Paul • Salem • Sioux City • Zanesville

End the Triple Menace TO COPPER TUBE AND BRASS PIPE LINES



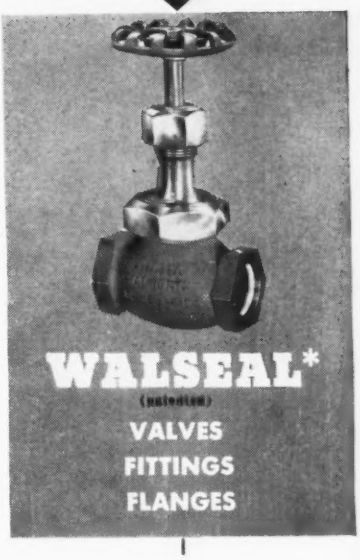
with THREADLESS SILBRAZ* JOINTS

Shock! Vibration! Corrosion! Yes, a Silbraz Joint made with Walseal* valves, fittings and flanges "has what it takes" to overcome this triple threat to copper tube (iron pipe size) and brass pipe lines – and for keeps.

Why? Because patented Walseal valves, fittings and flanges get their *extra* stamina from a ring of silver brazing alloy built right into each port . . . an alloy that when heated with an oxyacetylene torch flows out between the pipe wall and the fitting, making a joint that is stronger than the tube or pipe itself.

In thousands of installations, these Walseal products have proved beyond dispute that they make a "one piece pipe line" . . . a pipe line that does not creep or pull apart under any shock, vibration or temperature to which the copper tube or brass pipe can be safely subjected.

Write today to Dept. 84 for Catalog 42 giving complete data on Walseal products, as well as on the entire Walworth line.



Make it a "one-piece pipe line" with WALSEAL

12 AWARDS TO 4 PLANTS

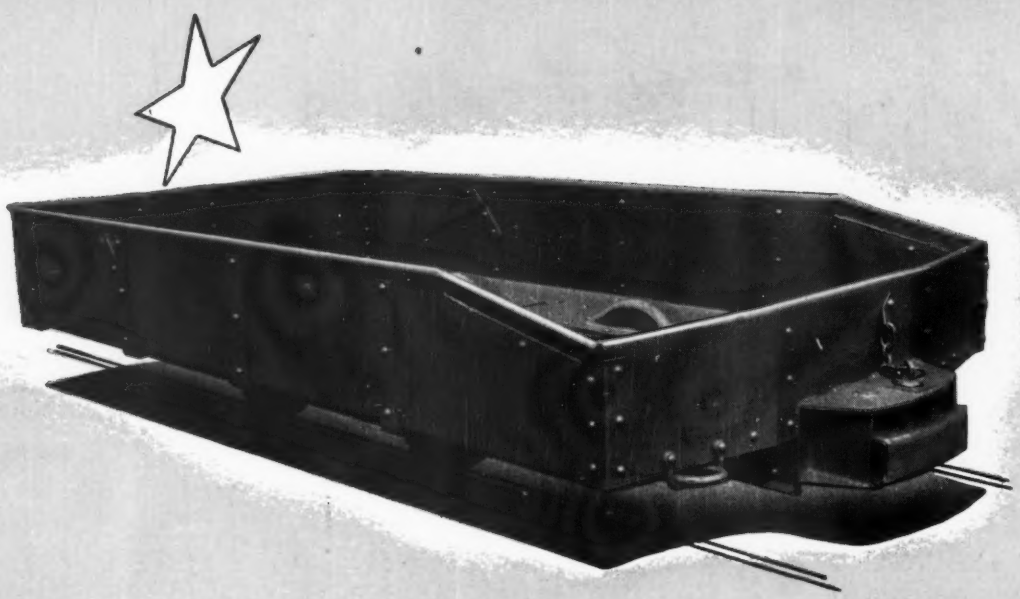
WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

*Patented — Reg. U.S. Patent Office



Modern Mine Cars

. . . have Many

Greater Capacity. which permits that extra pay-load! *Greater Safety.* with less derailments, which cause costly delays! *Greater Production.* requires hauling fewer trips for equivalent tonnage! *Greater Savings.* in maintenance and lubrication costs!

The A.C.F. end-dump type, four axle car shown is an excellent example of a modern mine car. The streamlined interior allows easy flow of coal in dumping. The inside lift-type end gate permits maximum car width within given dimensions. The bulb-angle sill construction with flanged floor plate provides that necessary support for those heavy loads. The electrically-welded end sill members, with double-action spring bumper at rear end of car, absorbs those draft and buffing shocks. Reduced height at rear end of car permits easy loading. Safety-loops at either end of car accommodate holding chains at the face, or elsewhere in your mine. A.C.F. Chilled Tread Wheels fitted with anti-friction bearings complete the picture.

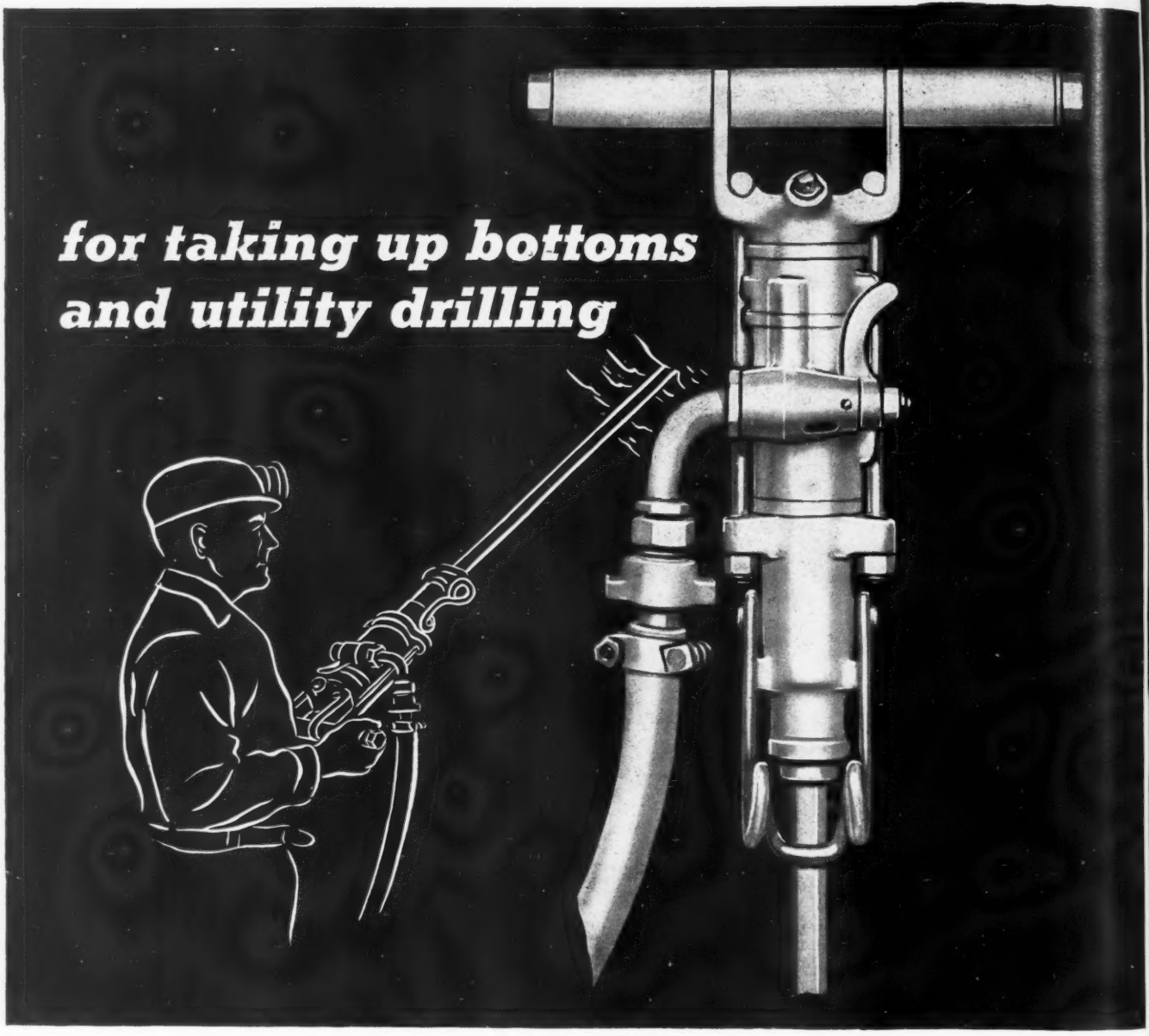
Our Sales Representatives will be glad to discuss the advantages of this type car with you. Contact our nearest sales offices.

...Advantages!

a.c.f.

AMERICAN CAR and FOUNDRY COMPANY

NEW YORK • CHICAGO • ST. LOUIS • HUNTINGTON, W. VA.
CLEVELAND • PHILADELPHIA • BERWICK, PA. • PITTSBURGH



LIGHT-WEIGHT CP-22 SINKER

LIGHT, perfectly balanced and easily operated by one man, the CP-22 Sinker speeds brushing down, taking up bottoms, coal drilling, and general maintenance work. Its high speed, penetrating blow and efficient hole-cleaning substantially reduce drilling time.

Designed for long service and low maintenance, the CP-22 Sinker is fully cushioned and automatically lubricated. Due to its low air consumption, the CP-22 Sinker Drill is ideal for operation with a portable air compressor.

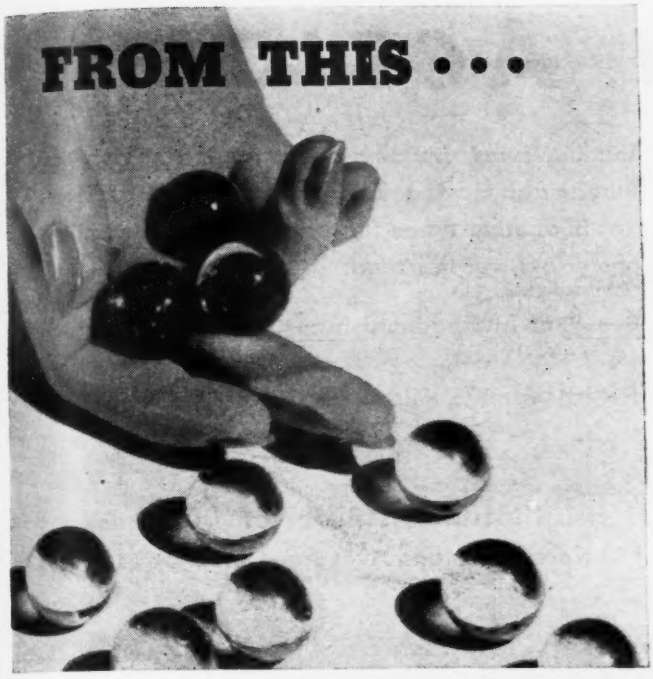
Chicago Pneumatic manufactures a complete line of dependable Sinker Drills, Drifters and Stopers. Write for details.

★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
HYDRAULIC TOOLS
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES



• • • AND THEN TO THIS

Marbles of special formula glass are used to produce fine fibers or filaments of glass for Rome Fiberglas Magnet Wire Insulation. Before melting, this glass is made in the form of marbles to facilitate rigid inspection for the elimination of all impurities which would prevent drawing the glass into filaments finer than the human hair.

The fine drawn glass strands are twisted and plied on standard textile machinery to form yarns for serving on Rome Fiberglas Magnet Wire.

This yarn is served, impregnated and baked on modern equipment especially developed by Rome Cable engineers, making available a basically improved magnet wire from the standpoints of high temperature resistance, extreme toughness, excellent space factor, good moisture, acid and abrasion resistance and superior thermal conductivity.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

POWER IN ACTION

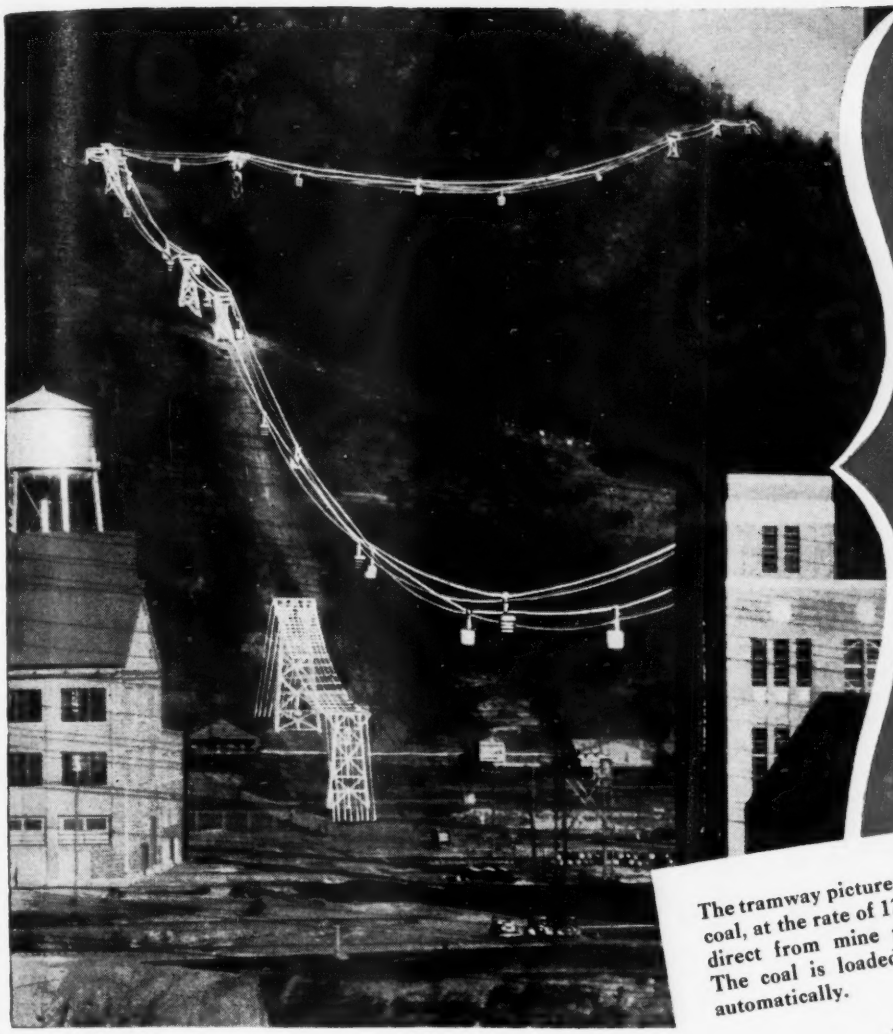
Here's an International TD-6 Diesel, equipped with a dozer shovel, hard at work on a huge bank of culm or "red dog." This pile of waste slate and coal is providing material for the manufacture of cement blocks and concrete foundations and for highway construction. It's a typical job for International Crawler Tractors—an operation where economy and endurance are prime factors.

Rugged Internationals have also carved a top-notch reputation for themselves in strip mining. For removing overburden, scooping coal into loading piles, building roads and a variety of other earth-moving jobs, International TracTrac-Tor is another name for efficient and economical power—*power in action.*

See your International Industrial Power distributor for the complete story on crawler tractors. He'll be glad to help you solve your power problems.

International Harvester Company
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL Industrial Power



This Direct Route Cuts Haulage Costs

The tramway pictured above delivers coal, at the rate of 175 tons per hour, direct from mine to power house. The coal is loaded and discharged automatically.

TRANSPORTATION by aerial tramway is independent of ground conditions. Highways, railroads, rivers, mountains and valleys can be crossed with savings in distance, time, money and effort. Snow, ice, rain, or mud present no difficulties to the operator who moves material by Aerial Tramways. *Operation is smooth, fast and efficient.*

Even over comparatively level ground, aerial tramway transportation is considered economically sound. In general, it costs less per-ton-mile to transport by aerial tramway than by other methods. The heavier the tonnage handled, the more profitable becomes the operation.

U·S·S American Aerial Tramways have been built from a few hundred feet to many miles in length, and with capacities ranging from 1½ tons to 300 tons hourly.

As the world's leading manufacturer of aerial tramways, we are in a position to furnish you with a transportation system that may completely modernize your material handling methods.

Our engineers welcome an opportunity to discuss Aerial Tramways with you. Recommendations will be submitted only after a study of your problems.

American Steel & Wire Company
Cleveland, Chicago and New York
Columbia Steel Company
San Francisco
United States Steel Export Company, New York

UNITED STATES STEEL

U·S·S American Aerial Tramways

USS STEEL UNITED STATES STEEL

EVERY SUNDAY EVENING, United States Steel presents *The Theatre Guild on the Air.* American Broadcasting Company coast-to-coast network. Consult your newspaper for time and station.

Coal Economy ...is achieved through the use of SPECIFIC GRADES

CASE HISTORY

Crucible Fuel Division, Crucible Steel Company of America, Crucible, Pennsylvania, uses two 48" **R & S** Hydro-Separators, two 7' and one 16' **R & S** Hydrotators to produce processed coal for metallurgical use at the rate of 400 tons per hour.

Run-of-mine capacity is 500 tons per hour. Raw coal screen-sizing, hand picking and crushing of the plus 4" material proceeds at this rate until 4" material is stored in a 2000 ton concrete bin. Further sizing to 4" x 1" and 1" x ⅜" for the coarse coal washing in **R & S** Hydro-Separators and ⅜" x 0" for the finecoal washing in **R & S** Hydrotators, is at the rate of 400 tons per hour. The blended and washed coal is reassembled for shipment in river barges or in railroad cars.

WISE COAL CONSUMERS

use the grade of coal particularly adapted to their specific requirements—

SMART PRODUCERS

clean and grade their coal to fit the specific requirements of their customers—or for their own use.

R & S HYDRO-SEPARATORS

Hydrotators—and Stump Air Flow cleaners are designed for better processing to meet these consumer demands. R & S descriptive bulletins should help you. We will be glad to send them to you upon request. Bulletin No. 161—R & S Tandem Hydro Separator; Bulletin No. 162—R & S Hydrotator; Bulletin No. 163—R & S Stump Air-Flow Cleaner.

R AND S COMPANY

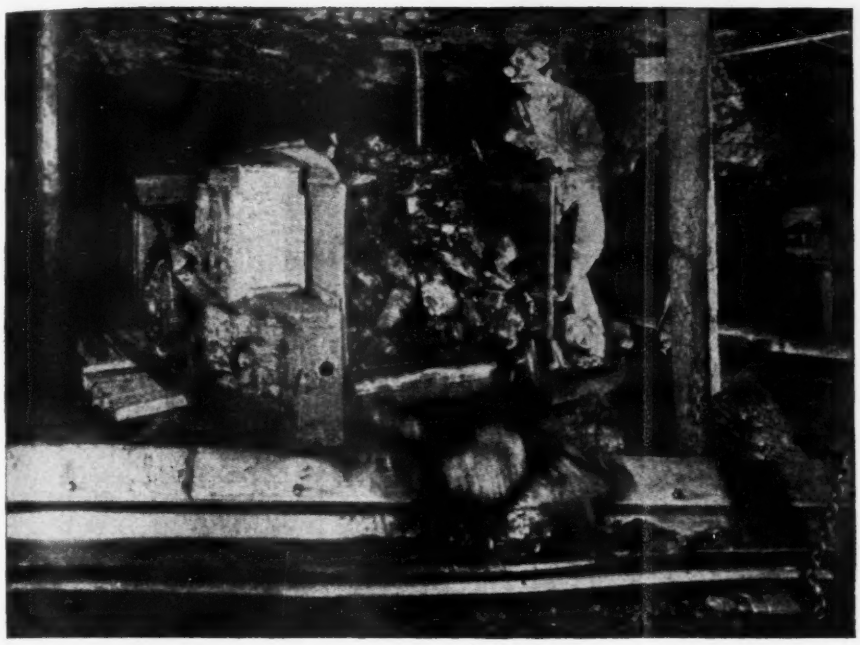
ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago 1

P. O. Box 865
PITTSBURGH, PA.

P. O. Box 570
HUNTINGTON, W. VA

BATTERY-POWERED Shuttle Cars Give Most Flexible Operation



. . . ALKALINE BATTERIES give most trouble-free power

Because they carry their own power supply, battery-operated shuttle cars have high operating flexibility. They require no external power connections to jeopardize safety, require maintenance, or delay production while being connected or disconnected and during the roundabout maneuvering often necessary to avoid running over them. Because they have a minimum of moving parts, they are easiest to keep in working order.

With batteries exchanged between shifts, a shuttle car is kept continuously supplied with power. While one battery operates the car, the other is charged. Not only does the car make efficient use of power but the current for battery charging is low-cost power because charging can usually be done during off-peak hours. In that case, a substantial reduction in maximum power demand is also effected.

Altogether, the superior flexibility, higher availability, and overall operating and maintenance economy of the battery-powered shuttle car make it an inherently dependable and efficient haulage unit—especially when powered by Edison Alkaline Batteries. With steel cell construction, an alkaline electrolyte that is a preservative of steel, and a fool-proof electrochemical principle of operation, they are the most durable, the longest-lived and most trouble-free of all mine-haulage batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Co., Ltd., Montreal and Toronto.

Edison
ALKALINE BATTERIES

READY NOW!

The Latest Information About Explosives and Blasting Equipment

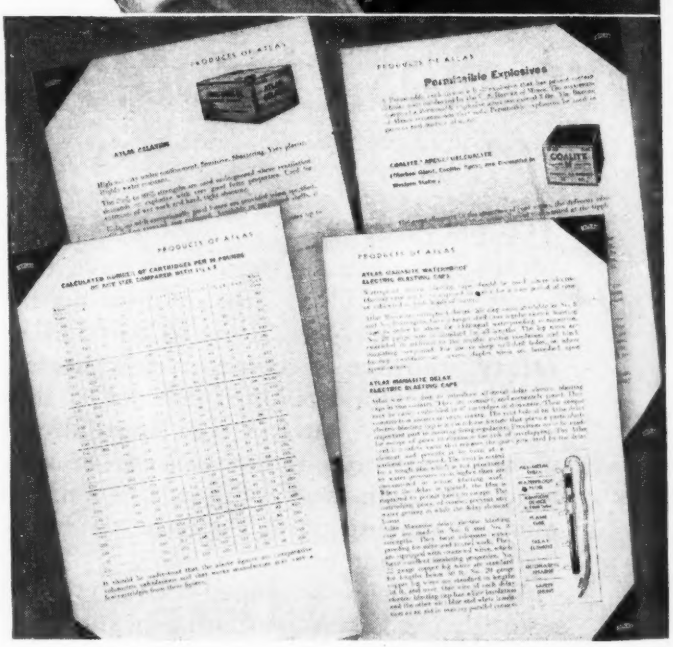
It's just been released—and it's completely up to the minute!

This new, pocket-size Atlas Catalog brings you full details about the Atlas line of explosives. For your further convenience, products are grouped for ready reference so that you can find what you want at a moment's notice.

Nor is this attractive informative booklet limited to explosives only. Here you will also find complete and up-to-date information about blasting caps, electric blasting caps, delay electric blasting caps, electric igniters, blasting machines, rheostats, galvanometers, fuses—all necessary blasting accessories.

In order to bring you complete specifications and descriptions in the handiest possible form, this new Atlas Catalog does not contain instructions on use. It suggests what to use for the best results—not how to use it.

But for everyone interested in safety, economy and efficiency as applied to blasting, this brand-new catalog is an absolute must. Purchasing agents, superintendents, operators and contractors are especially invited to write for a copy—or to ask the Atlas Representative for one.



ATLAS EXPLOSIVES
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

Designed FOR MORE COAL PER HOUR

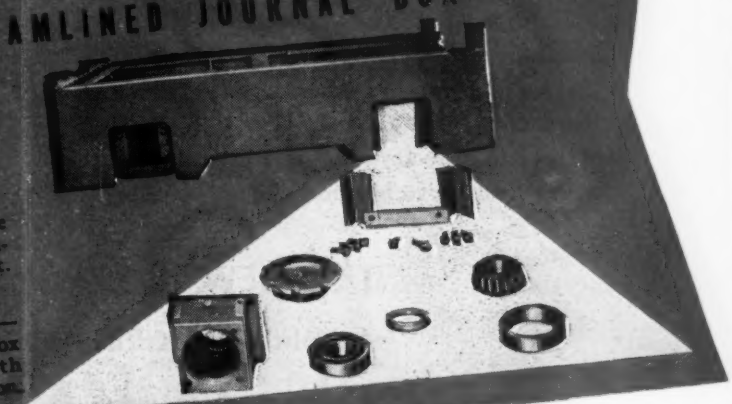
QUICK INSPECTION — SIMPLE MAINTENANCE — LONG LIFE

Mines are becoming more mechanized each year . . . to produce *More-Coal-Per-Hour*. For a low cost, maximum efficiency locomotive that meets special operating conditions and delivers maximum "on-the-job" haulage . . . it will pay you to investigate the outstanding features on the Westinghouse Mine Locomotive.

Equipment and parts are arranged for easy access which simplifies maintenance and inspection. The Streamlined Journal Box is just one of the many outstanding features designed to make the operator's job easier . . . to make Westinghouse Mine Locomotives ready at all times . . . to help produce *More-Coal-Per-Hour*.

For complete information — call your Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J15115

Example: STREAMLINED JOURNAL BOX



WHEN ADJUSTING—remove lock-nut . . . turn screw cover until tight . . . back off one notch . . . replace lock-nut. No covers . . . no shims.

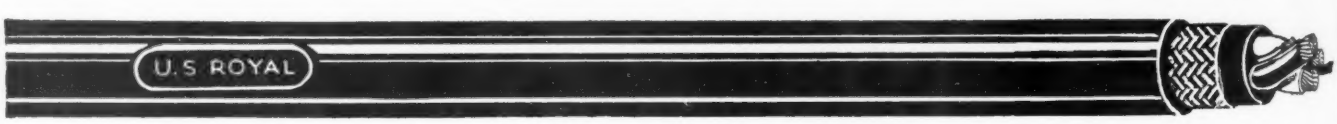
WHEN REMOVING—remove side angles and tie bar . . . unscrew cover, then pull box out. Simple as that.

ADDITIONAL FEATURES—removable wear plates on box and side angles . . . labyrinth grease seal . . . pressure lubrication.

Westinghouse
PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

Mine Locomotives

FREEZEROO



Colder than a penguin's tail-feathers—that's how the laboratory boys describe the freezing test.

In our laboratories, where the ultimate in punishing conditions are simulated, U. S. Royals are frozen at sub-zero temperatures, scorched in blazing heat, stretched mercilessly, compressed brutally, bent, twisted, and smashed—to prove their fitness to be certified "Safety Tested."

This safety testing gives you cords and cables that stand up under the rigors of mining jobs that demand never-failing ruggedness. Specify U. S. Royal.

THE NEW U. S. ROYAL *Safety Tested*

MINING MACHINE AND LOCOMOTIVE CABLES

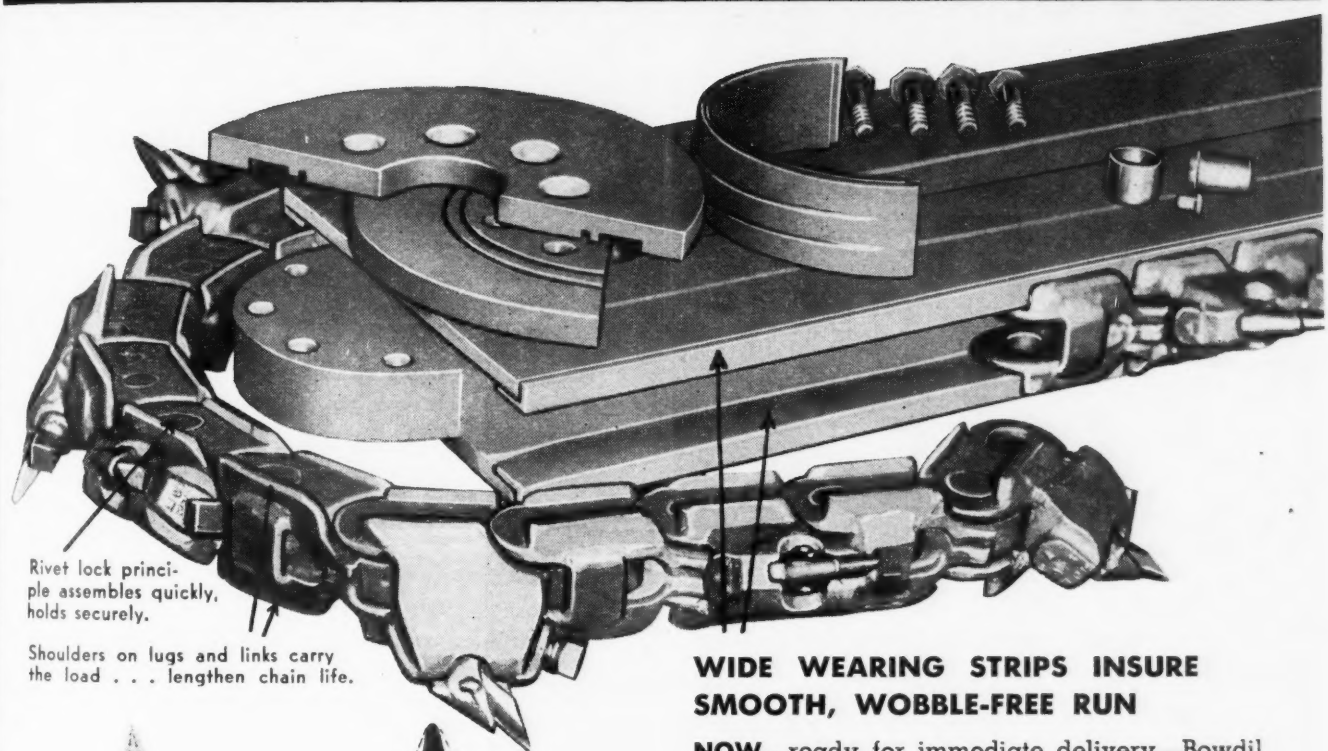
SERVING THROUGH SCIENCE WITH ELECTRICAL CORDS AND CABLES

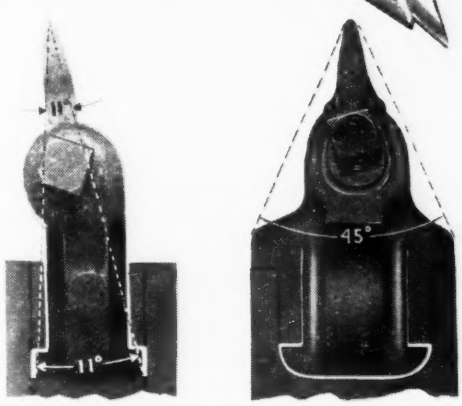
Listen to "Science Looks Forward"—new series of talks by the great scientists of America—on the Philharmonic-Symphony Program. CBS network, Sunday afternoon, 3:00 to 4:30 E.S.T.

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE • ROCKEFELLER CENTER • NEW YORK 20, N. Y.

Time and Money-Saving Features OF BOWDIL FABRI-FORGED CUTTER BARS AND CHAINS





CONVENTIONAL BOWDIL

Write for complete information contained in Bowdil's folder "Another Step Ahead." We will be glad to present cost saving facts.

WIDE WEARING STRIPS INSURE SMOOTH, WOBBLE-FREE RUN

NOW—ready for immediate delivery—Bowdil presents advanced equipment to meet modern needs economically. The shoulders on the lugs and links, plus the wider wearing strips on the bar greatly speed and improve cutting operations by:

1. Increasing bearing surfaces
2. Reducing leverages over ½
3. Stabilizing deflection

With Bowdil's famous Concave Cutter Bits in the holders, this equipment will definitely prove operating economy for you.

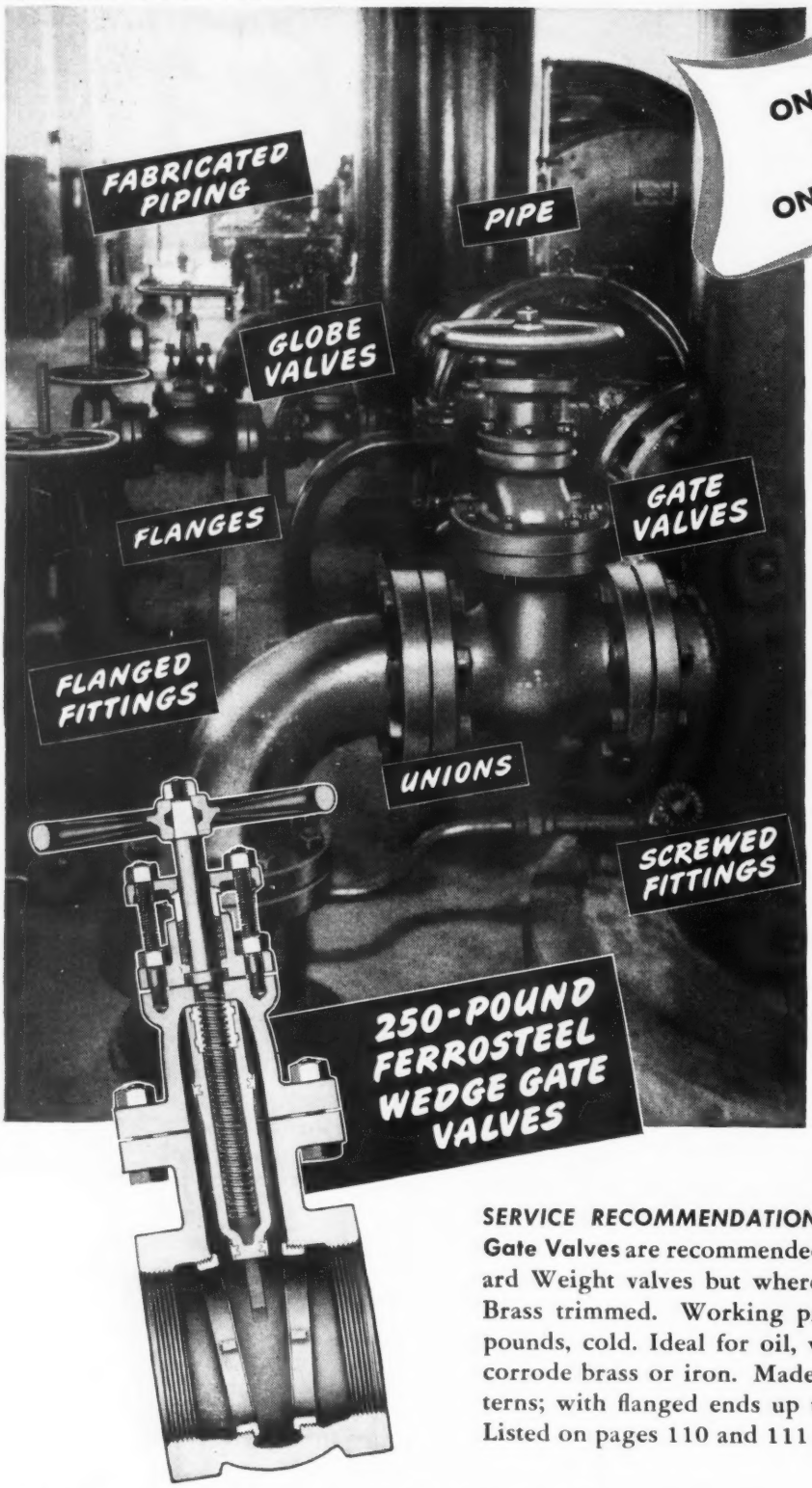
BOWDIL

COAL CUTTING EQUIPMENT

CANTON OHIO

Look to CRANE for help in Piping Equipment Problems

Hydro Power Plant in Mine



ONE SOURCE OF SUPPLY
ONE RESPONSIBILITY
ONE STANDARD OF QUALITY

No one knows better than you what equipment best meets the operating conditions of your piping systems. But Crane can be a real aid in making your choice. Crane offers the world's greatest selection of piping materials for all applications—makes it possible to get exactly what you need. And you can be sure of every item you select, for Crane shows you clearly the relevant advantages of all types.

Remember, too, that since all materials are uniform in quality, backed by single responsibility, you are assured of the best installation. You can order everything from a single source—your Crane Branch or Wholesaler—simplifying the whole job. Below is a typical example of how the Crane Line of valves answers the diversified needs of mining operations.

SERVICE RECOMMENDATIONS: **Crane 250-pound Ferrosteel Wedge Gate Valves** are recommended for services that are too severe for Standard Weight valves but where the use of steel valves is not required. Brass trimmed. Working pressure ratings: 250 pounds steam; 500 pounds, cold. Ideal for oil, water, steam and other fluids that do not corrode brass or iron. Made in O. S. & Y. and Non-Rising stem patterns; with flanged ends up to 12 in.; with screwed ends up to 4 in. Listed on pages 110 and 111 of your Crane Catalog.

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE

90 YEARS OF PROGRESS 1855 1945

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

Keep Production on the Move *with*

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

Modern mechanical mining equipment performs at its best when coal is dislodged by CARDOX.

The slow heaving action of CARDOX rolls coal forward for faster loading . . . with less wear and tear on mechanical loaders.

Loaders and other mechanical units are productive more hours each shift. Since CARDOX does not produce smoke or noxious fumes, work can be resumed immediately after the face has been dislodged.

The gentle action of CARDOX produces coarse sizes that are most economical to handle and clean. CARDOX-mined coal retains its inherently firm structure, greatly reducing degradation.

Since the pressure exerted by CARDOX is only a fraction of that generated by explosives . . . and there is no shattering detonation . . . the effect on a mine roof is very mild, reducing the hazards, costs and delays of roof falls.

A test of CARDOX in your own mine will reveal many more worthwhile benefits. Write for full details on free demonstration.

CARDOX
Hardsocg Drilling Equipment

Complete line of drilling equipment designed to give you the maximum in drilling efficiency.

CARDOX CORPORATION • BELL BUILDING • CHICAGO 1, ILLINOIS

Model F8C Cam and Roller Hoist with Type W12 Body. Capacity 5 cu. yds.

One-way side dump body with dual hydraulic hoist. Automatic downfolding side.

Always Good!

NOW BETTER THAN EVER

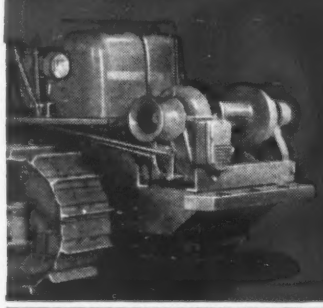
GAR WOOD

HEAVY-DUTY EQUIPMENT

For nearly three decades Gar Wood inventive genius, advanced engineering and high quality manufacture provided the world's finest medium and heavy-duty construction equipment. Then came the period when Gar Wood bodies, hoists, winches, etc., were made for one customer—Uncle Sam. Notable mechanical improvements and even greater strength were engineered and built into these rugged units to give them a new high in performance and efficiency.

And now, with the resumption of civilian production, Gar Wood will build still better heavy-duty equipment . . . . with greater values and longer life than ever before.

BUY VICTORY BONDS



↑ 4-Wheel Cable Scraper—capacities 11, 15, 20 and 25 cu. yds. Rolling ejection. Accurate spreading.

← Tractor or utility winches.

Extra heavy duty type → X112 rock body with open or scoop-end. Hydraulic, twin telescope hoist Model T-4440.

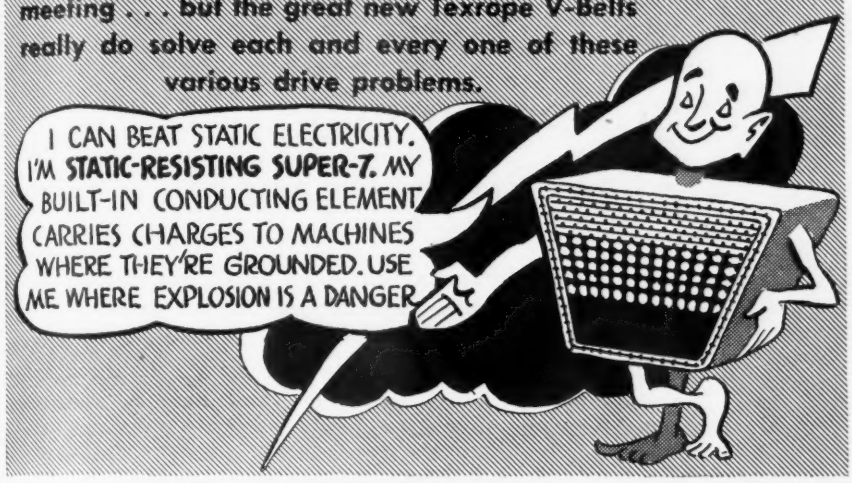
GAR WOOD INDUSTRIES, INC.

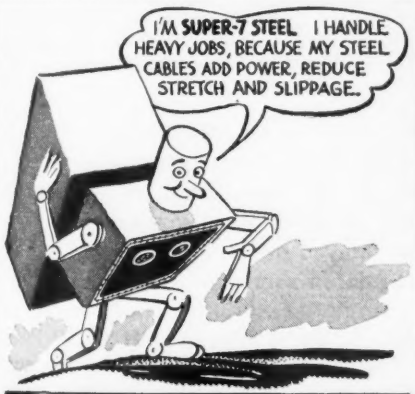
DETROIT 11, MICH. WORLD'S LARGEST MANUFACTURER OF TRUCK AND TRAILER EQUIPMENT

HOISTS AND BODIES • WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

TALL TALES ...but TRUE!

Their exploits may sound like a "Liars Club" meeting . . . but the great new Texrope V-Belts really do solve each and every one of these various drive problems.


I CAN BEAT STATIC ELECTRICITY. I'M STATIC-RESISTING SUPER-7. MY BUILT-IN CONDUCTING ELEMENT CARRIES CHARGES TO MACHINES WHERE THEY'RE GROUNDED. USE ME WHERE EXPLOSION IS A DANGER.



Texrope V-belts are available nation-wide through Allis-Chalmers Dealers and Sales Offices. It pays to make Allis-Chalmers your V-belt drive headquarters.

ALLIS-CHALMERS

Texrope Super-7 V-Belts result from the cooperative research of two great companies—Allis-Chalmers and B. F. Goodrich—and are sold exclusively by A-C.

A 1960

BULLETIN!

SPEED RECONVERSION WITH HELP OF NEW FREE A-C KIT!

Guide to "How to Take Reconversion Inventory" of Drives, Motors, Pumps

Help in the big job of reconverting for peacetime production is now offered to plants everywhere by Allis-Chalmers Mfg. Co., its district offices and distributors. To all who request it, we're sending the new "Reconversion Inventory Kit", planned to speed the task of determining the condition of your existing equipment — V-belt drives, motors, and centrifugal pumps — which will be used in reconverted production.

SUGGESTS PROCEDURE, STATES STANDARDS

Used by foremen, maintenance men, and engineers, the Kit is a real time-saver . . . leads efficiently to probable trouble spots, helps clear them up. Gives bearing tolerances, resistance formulae, etc., in compact, easily-used form. Check List appraisal charts help determine present and future condition of units inventoried.

HOW TO GET YOUR KIT

For your free Reconversion Inventory Kit, call your nearest Allis-Chalmers distributor or district office, or write Dept. 78, ALLIS-CHALMERS MFG. CO., Milwaukee 1, Wis.

ALLIS-CHALMERS MFG. CO.
Dept. 78, Milwaukee 1, Wis.

Please send Reconversion Inventory Kit free of charge to:

Company.....

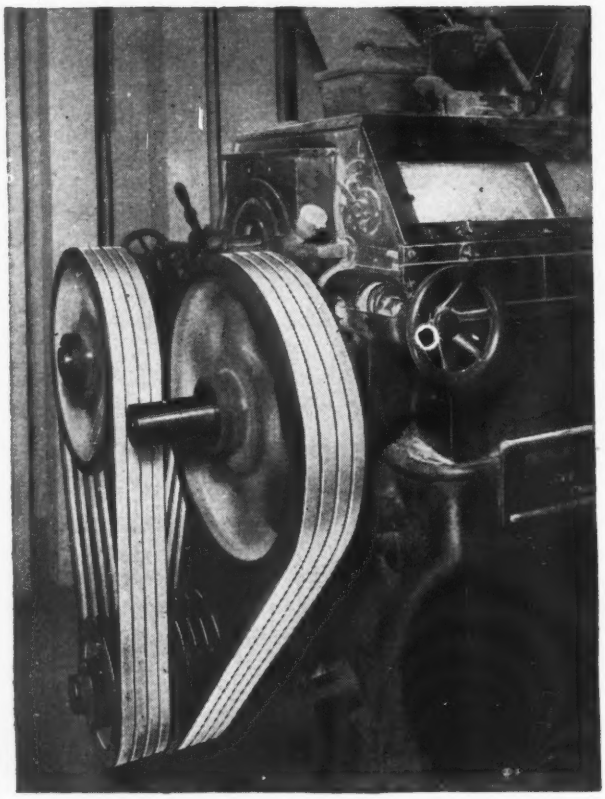
Address.....

.....

Attn. of Mr.....

The reason for this fact is worth knowing

Your STANDARD GATES VULCO ROPES are TODAY out-performing ANY V-Belts EVER Built Before!



All Gates V-Belts are Built with The Patented CONCAVE SIDE

During the war, our Army tanks, tractors and self-propelled big guns required, for *combat* service, V-belts built to performance standards never dreamed of before. Gates developed these greatly superior V-belts through intensified, specialized research — and here is what this NOW means to you:—

Here is the reason

● Every improvement developed by Gates for these Army V-belts has also been added, day by day, to the quality of the standard Gates Vulco Ropes which have been delivered to you.

Here is one rare instance in which you have received *immediately* the full advantage of war-time improvements developed primarily for military use. Ordinarily, *you* have to wait. But in the case of Gates V-belts, everyone recognized the vital role they played in maintaining the production that proved so essential in winning the war.

That is why Gates has been able to pass on to you, day by day, every V-belt improvement developed for our armed forces during the war — and that is why your *Standard* Gates Vulco Ropes are today outperforming *any* V-belts ever built before!

Gates

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THE GATES RUBBER COMPANY

Engineering Offices and Jobber Stocks in All Large Industrial Centers

4511

GATES VULCO ROPE DRIVES

CHICAGO 6, ILL., 549 West Washington. NEW YORK CITY 3, 215-219 Fourth Avenue. ATLANTA 3, GA., 521 C. & S. Nat'l Bank Bldg.

LOS ANGELES 21, CAL., 2240 E. Washington Blvd. DENVER 17, COLO., 999 S. Broadway. DETROIT 2, MICH. 223 Boulevard Bldg.

PORTLAND 9, ORE., 333 N.W. 5th Ave. DALLAS 2, TEXAS, 1710 N. Market St. SAN FRANCISCO 3, CAL., 170 Ninth St.

Before you buy any Bethlehem steel ties, you may want to know what other mining men are saying about them. We've heard plenty of comments, but the four quoted above are probably the most typical. They're the "reason why" behind so many repeat orders.

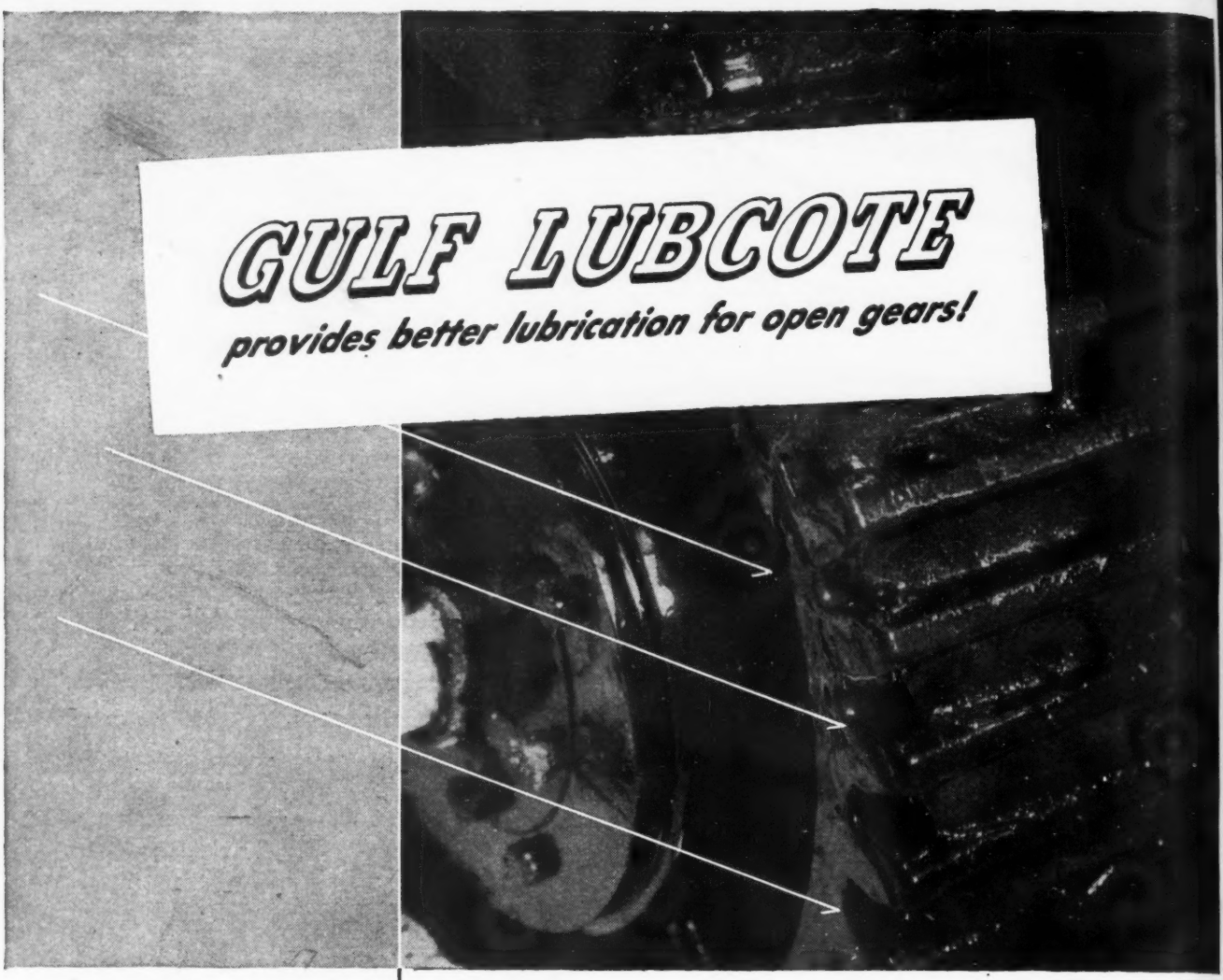
Bethlehem ties are made in numerous sizes, ranging from light and medium weights to the heavy-duty 6's and 9's. You'll like these bigger fellows where speeds are high and where track takes a lot of pounding from heavy equipment.

The No. 6, for instance (weighing 6 lbs. per ft.), is widely used in entries, headings, and secondary haulage track. The No. 9 (weighing 9 lbs. per ft.) is recommended for main-haulage track underground where heavy locomotives and large-capacity cars are used; also for narrow-gage main-line track in open-pit mines.

These ties maintain gage and protect switches even when interspersed with every three or four wood ties. Here they are silent watchmen on 24-hour duty . . . keeping the track in running condition till rotted-out wood ties have been detected and replaced.

Whether you use riveted clips or bolted clips, installation is child's play. You can put your greenest man to work with 6's or 9's. He'll have them installed in a jiffy. Then watch your haulage costs drop!

Ask for Booklet 188. It tells you more about these rugged steel ties—where to use them and how they simplify your haulage problems. Many pictures of installations and structural features. Write to Bethlehem Steel Co., Bethlehem, Pa., for your free copy.



√ stays on √ saves wear √ helps keep them smooth-running

Four reasons... WHY GULF LUBCOTE IS A SUPERIOR LUBRICANT FOR OPEN GEARS

1. GULF LUBCOTE is a heavy-bodied product with a high degree of adhesiveness for metal surfaces —it stays on!

2. Due to the selected crudes used and to the process of refining employed, GULF LUBCOTE possesses unusual lubricating qualities.

3. The lubricating film provided by GULF LUBCOTE, in addition to being impervious to moisture, acid fumes, and gases, withstands extreme temperature changes.

4. Due to the tough and tenacious nature of GULF LUBCOTE, it effectively reduces objectionable gear noise and at the same time provides maximum protection against corrosion, pitting, or excessive wear of the gear teeth.

GULF LUBCOTE is made in seven grades, to provide for various methods of application and a wide range of operating conditions.

GULF LUBCOTE NO. 1 can be applied at normal atmospheric temperatures without heating, by brush, swab, or bath. In addition to gears this grade is an excellent lubricant for: flexible couplings, chains, cables, center plates and hub liners (railroads).

GULF LUBCOTE H.S. is especially manufactured to withstand the washing action of water. It is of medium viscosity and can usually be applied by hand without heating. Additional uses: chains and wire cables.

GULF LUBCOTE NO. 2 has approximately the same consistency as the H.S. grade. Principal uses: motor gears (street railways), guy wires, wire rope.

GULF LUBCOTE NO. 3 should be heated for easy application. Principal uses: chains, or applications where lubricants are subjected to transmitted heat.

GULF LUBCOTE NO. 5 must be heated for ready application. This grade has high heat resisting properties—a decided advantage when used on gears exposed to high operating temperatures.

GULF LUBCOTE TRACTION has the consistency of a No. 3 Cup Grease. It can easily be applied by hand at normal temperatures. Recommended for gears of street railways, mining and yard switching locomotives, etc.

GULF LUBCOTE W.R. is especially compounded for use by manufacturers in laying up wire rope and for impregnating hemp centers.

GULF INDUSTRIAL LUBRICATION

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia
Pittsburgh · Atlanta · New Orleans
Houston · Louisville · Toledo

This double purpose Walter Tractor Truck wastes no time—puts in a full working week at *both* coal and overburden. With two bottom dump coal trailers attached, the Walter Tractor Truck hauls 60 ton payloads at speeds that deliver top tonnage. Hooked to the 20 cu. yd. side dump overburden trailer, it gets through the toughest spots with full load. It does not stall or bog down on steep grades, soft ground, deep mud and slippery surfaces. That means less time spent on overburden, more coal stripped.

The Walter Four Point Positive Drive, with three automatic locking differentials, eliminates wheel spinning—reduces wear and tear on roads and tires. The Suspended Double Reduction Drive places all vital parts safe from jutting rocks and deep ruts. Load is carried on a solid forged steel axle, having high ground clearance. The Walter Tractor Truck maneuvers quickly and easily because of its short turning radius, engine-ahead-of-wheels and hydraulic steering. Write for complete description and specifications.

WALTER
TRACTOR TRUCKS

WALTER MOTOR TRUCK CO. 1001-39 Irving Avenue Ridgewood 27, Queens, L.I., N.Y.

This Power Clutch NEVER "Takes Over"

RETAINS "FEEL" OF THE LOAD

Unlike a booster clutch, which gives the operator no more than "on-or-off" control, the Koehring 605 Power Clutch never takes over. Simple linkage maintains constant control over the main clutch band. Complete control is maintained over the in-between stage, between full engagement and full disengagement. There is no continuous slipping booster, no complicated, sensitive network of air lines.

ONE-TENTH THE LEVER PULL

In all operations, a light lever pull sets this powerful 37-inch clutch—only 1/10 the pull required to set a manual clutch of comparative size.

AUTOMATIC HEAT ADJUSTMENT

Continuous, time-consuming adjustments for heat expansion are unnecessary on the Koehring Power Clutch. A large compensator spring automatically makes the required tension changes.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

KOEHRING
605

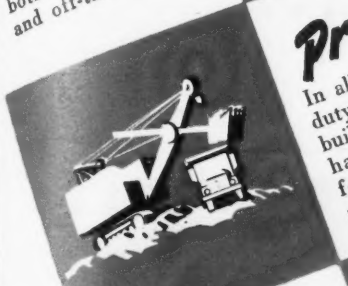
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

DEPENDABILITY PROVED in a greater variety of applications than *any other diesel*

Proved

In heavy-duty trucks, both on-the-highway and off-the-highway.



Proved

In all types of heavy-duty earth moving, road building and material handling equipment for contractors and aggregates producers.

Proved

In tugs, ferry boats, commercial fishing boats, fire boats, as well as pleasure craft . . . for both propulsion and auxiliary service.

Proved

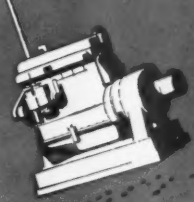
In every kind of mining power application . . . both above ground and below . . . stripping, loading, hauling, stationary and marine.

Proved

In yarders, loaders, trucks, tugs and sawmills . . . in all classes of portable and stationary service . . . on the show and in the mill.

Proved

In rotary rig, cable tool, pumping, generating and well service applications in all of the important petroleum producing areas.

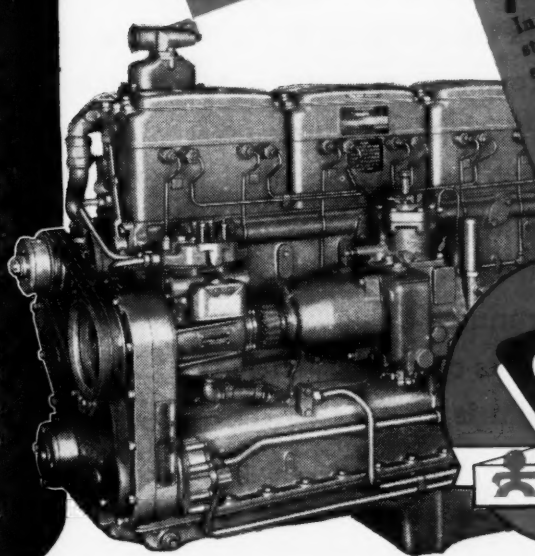


Proved

In locomotives, motor trains, maintenance-of-way and other types of equipment operated by the nation's railroads.

Proved

In the widest range of stationary applications, such as flour and feed mills, ice and refrigeration plants, dairies, cottonginsandmanymore.



Read the Record

1. More than 90% of the long-line, franchise-operated, heavy-duty, diesel-driven trucks in the 11 Western States are Cummins Diesel-powered.

2. In the world's largest petroleum producing region—the Mid-Continent Area—Cummins Diesels power more rigs than any other diesel engine.

3. More yarders, loaders and trucks in the Northwest Woods are powered by Cummins Diesels than by any other single make of diesel engine.

4. On the Mesabi Iron Range—largest in the world—most of the rubber-tired earth and ore moving equipment is Cummins Diesel-powered.

CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana

CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

THE *"Missing Link"* ISN'T ALWAYS A MONKEY...

IT COULD BE A

FIRST CLASS COAL SALES COMPANY

TOMORROW your "missing link" might be a sales company to move your coal.

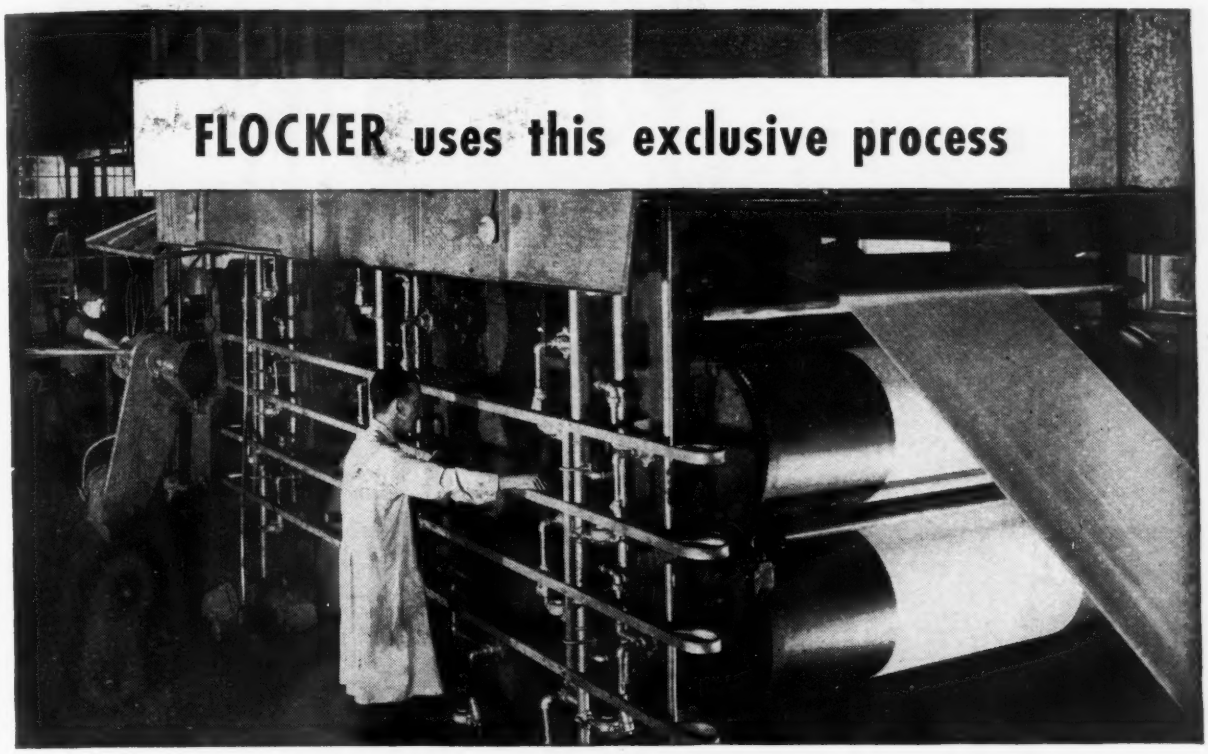
The continuous operation of your mine is the result of a chain of circumstances which are not automatic. The fact that you can produce coal is a basic link in the chain, but alone it is not enough to guarantee full running time.

Knowing who wants coal and selling it to him is as important as producing it. Mining coal is one thing . . . getting enough money for it is another.

A four-year War has dimmed these facts. It is now time to think about them again. Soon "priorities" will be on selling . . . not producing.

Improve your opportunities by maintaining and using your normal sales connections . . . NOW.

AMERICAN COAL Sales ASSOCIATION . . . Washington, D.C.



. . . to give you *better brattice cloth*

Flocker Moropa Brattice Cloth offers greater resistance to fire and mildew . . . stays clean longer and, under identical conditions, outwears the ordinary product.

This all-around superiority is achieved through an exclusive chemical process applied to either Jute or Cotton. The fabric is first saturated with special chemicals, then "can-dried"—a process adapted from the textile field—which thoroughly impregnates and bakes fire and mildew resisting properties into every fiber of the material.

And yet, in spite of its superior qualities, Flocker Moropa Jute Brattice Cloth costs you no more than ordinary Brattice Cloth . . . and prices are only slightly higher on Cotton. In reality, substantial savings can be realized on the use of either type.

If you're interested in the advantages this better Brattice Cloth affords, write for detailed information and quotations.

PROVED SUPERIORITY IN COTTON OR JUTE!

SUPERIOR FIRE-RESISTANCE—Protection lasts almost indefinitely, since chemicals are so thoroughly impregnated that they do not readily leach out.

SUPERIOR MILDEW REPELLENCE—Chemicals used do not absorb excessive moisture and fabric remains relatively dry and repellent to mildew.

STAYS CLEAN—Does not collect mildew "whiskers"—hence no slimy dirt.

LONGER SERVICE—Can be used and re-used over and over again. Absence of slime eliminates objections to recovery—men will co-operate in maintaining this Brattice Cloth which so vastly improves their working conditions.

JOHN FLOCKER AND COMPANY

644 GRANT STREET, PITTSBURGH 30, PA.

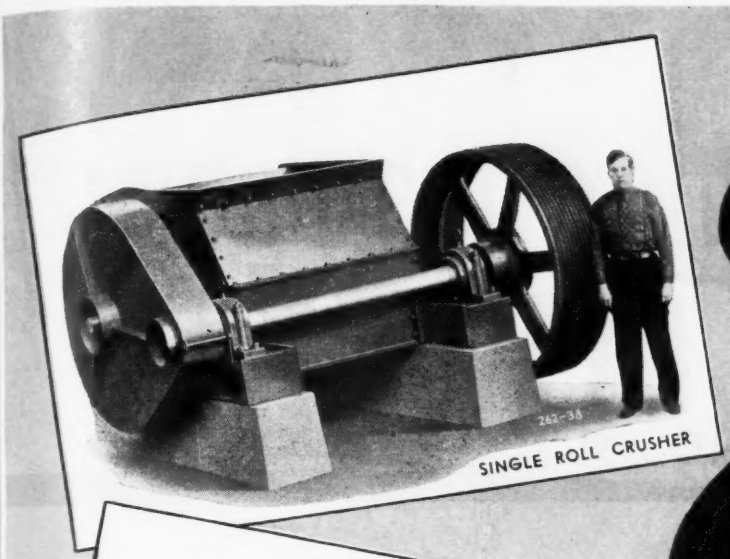
Since 1822, Ropes, Slings, Nets and Cordage Fittings, Tackles, Waxed and Unwaxed Linen . . . Specialists in Cordage Problems . . . Wire Rope

Preformed wire rope

SAVES MONEY 3 WAYS

Are you looking for new ways to cut your production costs? Then follow the lead of successful operators, in every industry, who use Preformed wire rope. Their records prove that it saves money. First, because it lasts longer. This results from Preformed's ability to resist bending fatigue. Second, it saves money because it withstands heavy shock loads and thus helps avoid costly shut-downs. Third, Preformed spools better on the drum, and helps to maintain a profitable speed of operation. You can gain these and many other advantages by specifying Preformed the next time you order wire rope.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

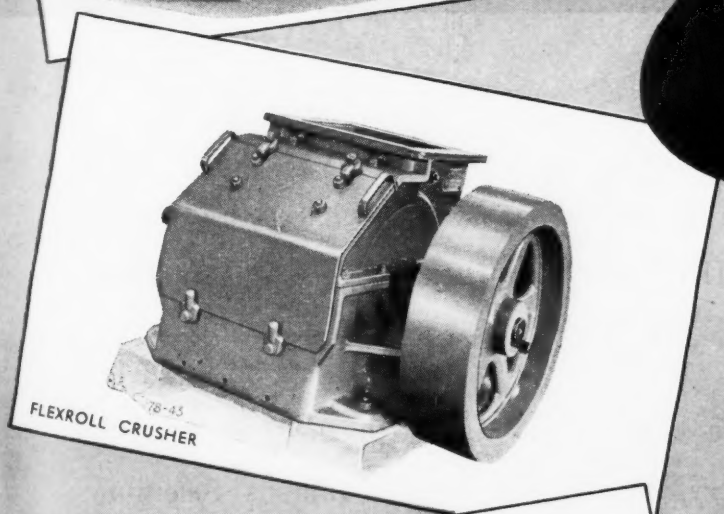


In the Coal Industry

69 YEARS' EXPERIENCE

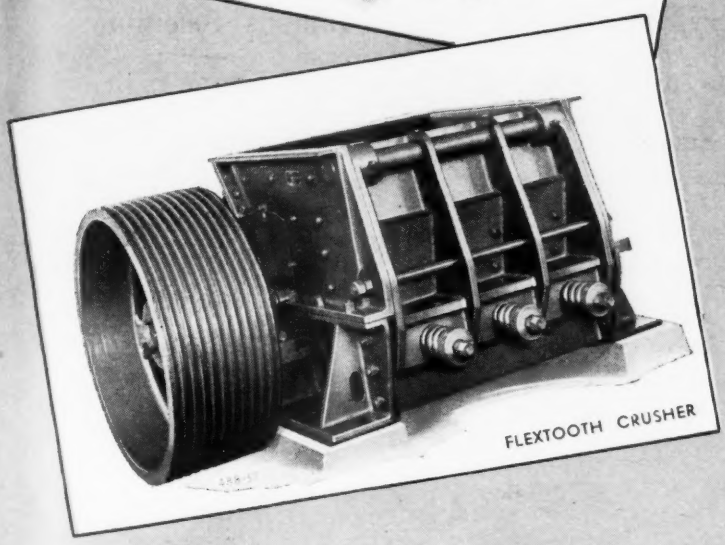
over

4,000 CRUSHER INSTALLATIONS



JEFFREY HAS THE KNOW-HOW BASED ON ACTUAL PERFORMANCE

When it comes to making Egg, Nut, Stoker or smaller sizes, Jeffrey has the exact crusher to fit your specific requirements, whether fines are desirable or objectionable. Send for Catalog 784.



THE JEFFREY MANUFACTURING COMPANY

912-99 North Fourth St., Columbus 16, Ohio

ESTABLISHED 1877

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Birmingham 3 · Chicago 1 · Denver 2 · Houston 5 · New York 7 · Salt Lake City 1
Boston 16 · Cincinnati 2 · Detroit 13 · Huntington 19 · Philadelphia 7 · Scranton 3

AGAIN_Simplex has done it!

Flame RESISTING TIREX

Simplex has done it again by offering, at no extra charge, its famous Selenium Rubber Armored TIREX cables with flame-resisting qualities added to the jacket.

This new TIREX feature helps to reduce the hazards in what is obviously a hazardous industry. In addition to the famous Selenium Rubber Armor which protects all Simplex-TIREX cables, flame-resistance has been added to the Selenium Rubber Armor with no reduction in its wearing quality.

The next time that you need portable cables for coal mine service, specify TIREX if you want long-lasting service combined with safety and dependability.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

Simplex

WIRES and CABLES

MARION TEAMWORK!

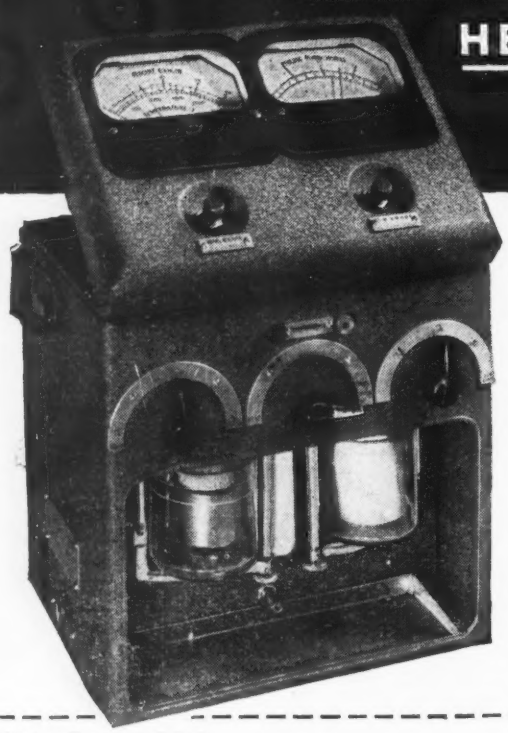
At United Electric Coal Corporation's Fidelity Mine, a MARION 35 cubic yard stripping shovel clears the way for a MARION 7½ cubic yard coal loader. Such TEAMWORK is paying BIG DIVIDENDS on numbers of the country's foremost coal stripping operations.

What is your coal stripping problem?

THE MARION STEAM SHOVEL COMPANY
Marion, Ohio
Offices and Warehouses in All Principal Cities
3/4 cu. yd. to 40 cu. yds.

How many dollars... do your furnaces BURN?

YOU CAN FIND OUT IN A FEW MINUTES WITH THE INDUSTRIAL HEAT PROVER



This unique instrument indicates simultaneously the percentage of unburned fuel, or oxygen present in flue gases . . . and it does it in just a few minutes.

With this data the Cities Service engineer can show you at once how to *save* on fuel costs, and what this saving will mean to you each year in dollars and cents.

The Cities Service Industrial Heat Prover has been used successfully with every kind of fuel and with every type of combustion equipment in this country.

Also used successfully for controlling furnace atmospheres in the heat treatment of steel.

For information leading to a demonstration on your own equipment, contact Cities Service or . . .

Cities Service Oil Co.
Room 483, 70 Pine Street, New York 5, N. Y.

Gentlemen: Please send me further information on the Cities Service Industrial Heat Prover—at no obligation to me.

Name .....

Title .....

Company .....

Address .....

City ..... State .....

MAIL THIS COUPON TODAY

(Available only in Cities Service Marketing Territories East of the Rockies)

CITIES SERVICE OILS
ONCE-ALWAYS

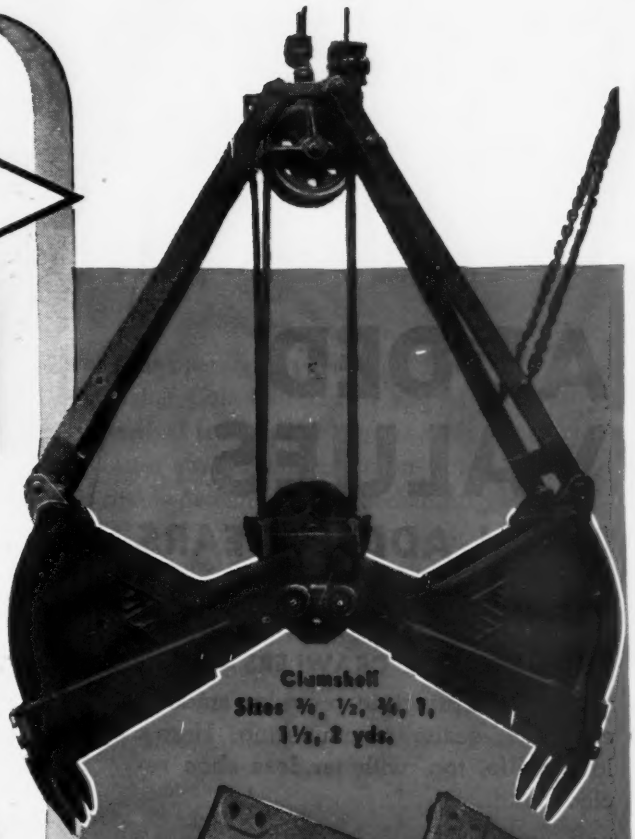
PMCO

America's Most Complete Line of Material Handling Buckets

All purpose-

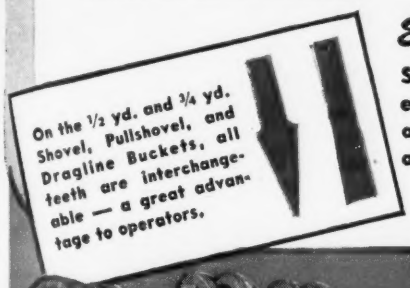
- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL

• FRONTS, BOTTOMS, SCOOPS and TEETH shown in red on buckets are 14% manganese steel developing tensile strength up to 120,000 p.s.i. This high percentage manganese steel gives tough, rugged strength for hard service and allows wide set corner teeth for easy entrance in digging. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.



Clamshell
Sizes ⅜, ½, ¾, 1, 1½, 2 yds.

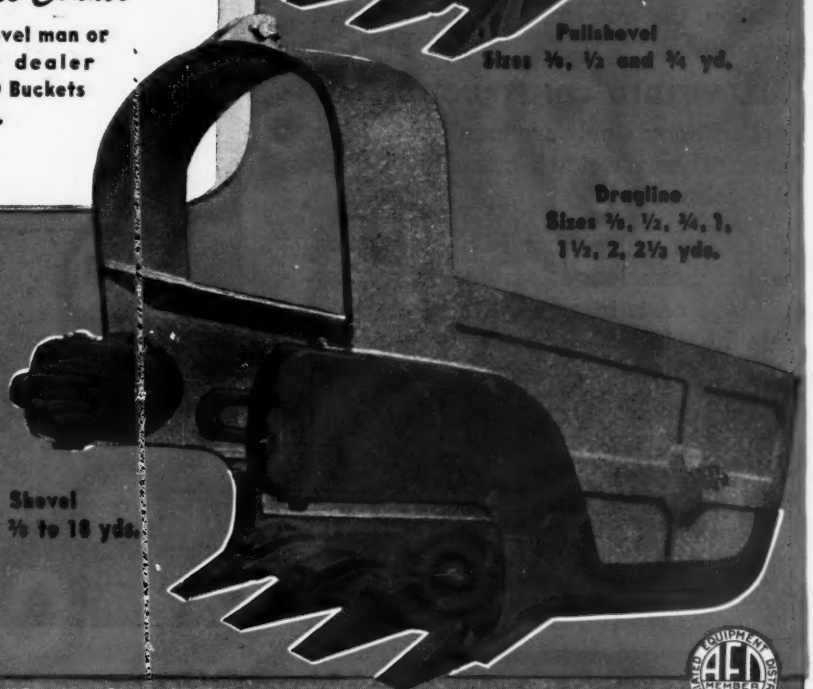
Pullshovel
Sizes ⅜, ½ and ¾ yd.



On the ½ yd. and ¾ yd. Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable — a great advantage to operators.

Experience Counts

See your shovel man or equipment dealer about PMCO Buckets and Dippers.



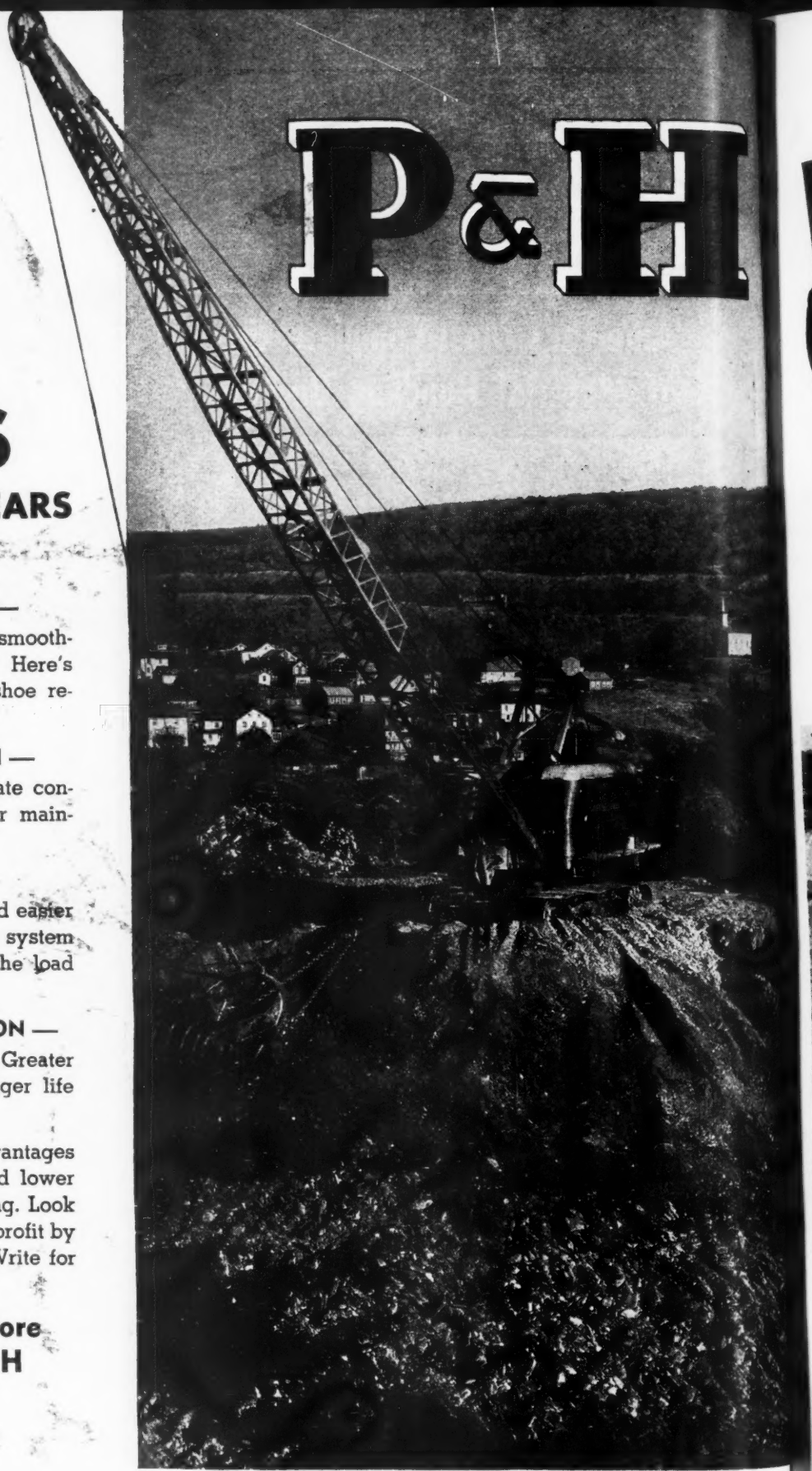
Dragline
Sizes ⅜, ½, ¾, 1, 1½, 2, 2½ yds.

Shovel
Sizes ⅜ to 18 yds.

"Quality Since 1880"

PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.



ADDED VALUES

MEAN ADDED YEARS OF SERVICE

TRUE ROLLING CRAWLERS — roller chain principle provides smoother travel, easier maneuvering. Here's longer life, too, with far less shoe replacement.

PLANETARY TRANSMISSION — faster reversal and more accurate control of bucket or dipper; lower maintenance costs.

HYDRAULIC CONTROL — for smoother, faster response and easier operation. This low-pressure system enables the operator to "feel" the load at all times.

ALL WELDED CONSTRUCTION — Rolled alloy steels are tougher. Greater strength and rigidity mean longer life throughout.

There are many other P&H advantages which mean longer service and lower tonnage costs in open pit mining. Look into the added values *now* and profit by them in the years ahead. . . . Write for literature.

Your Dollars Buy More When You Buy P&H

P&H EXCAVATORS

4540 West National Avenue,
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

P&H Excavators are available in sizes from 3/8 to 6 cubic yards; gasoline, Diesel or electric powered.

Rock Doesn't Count

IN PRODUCTION TOTALS!

Time and labor spent in rock handling—in room and entry preparation—is "lost" time as far as tonnage totals are concerned. That's the reason many mine operators are turning to the one method of coal transportation that eliminates unnecessary labor costs: the conveyor system, or, more specifically, the La-Del Shaker Conveyor.

Here is a coal transportation medium that provides continuous service, that is quickly and easily installed without previous preparation and that will increase the tonnage output per man from the moment it begins to operate in your mine. Flexible—the La-Del Shaker Conveyor can be angled to 30 degrees with swivel troughs, 90 degrees with turns—it meets almost any mining condition. Simple in design—no chains or belts, fewer mechanical parts—it requires less maintenance.

There are additional reasons why La-Del Shaker Conveyors can eliminate "lost" time in your mine; increasing production and lowering operating costs. La-Del engineers will analyze your mine transportation problems and point out the practical advantages of this modern method of moving coal underground.

A Model U-17 shaker conveyor working successfully in a thin seam of fine, wet coal.

MATERIAL HANDLING LA-DEL MINE VENTILATION

LA-DEL EQUIPMENT INCLUDES—Belt Conveyors • Chain Conveyors • Elevating Heads • Pit Car Loaders • Mobile Loading Machines • La-Del Troller Mine Ventilating Fans and Blowers • And La-Del Experienced Engineering Counsel • Before and After Installation.

ARMY E NAVY

LA-DEL CONVEYOR AND MANUFACTURING CO.

New Philadelphia, Ohio

COMPLETE LINE OF UNDERGROUND CONVEYORS FOR LOW COST OPERATION

PAY LOADS THAT PAY OFF

When you find it practical to put one big truck to work in place of several small ones, you have taken a long step toward a permanent reduction in hauling costs . . . *provided* you can depend on it to take a beating and stay on the job.

Your first look at one of the new Ward LaFrance models will indicate what experience as an owner will prove . . . that here's a wholly new standard of truck building for *stamina*. No wonder . . . because it is based on practical experience building the famous Army heavy wreckers built to start their job where other vehicles failed.

Ward LaFrance trucks are designed and built for heavy hauling on or off the road. Two, four, or six-wheel drive. Look into their practical advantages today. If there is not yet a dealer in your community . . . write direct to Great American Industries, Inc., Ward LaFrance Truck Division, Elmira, N. Y.

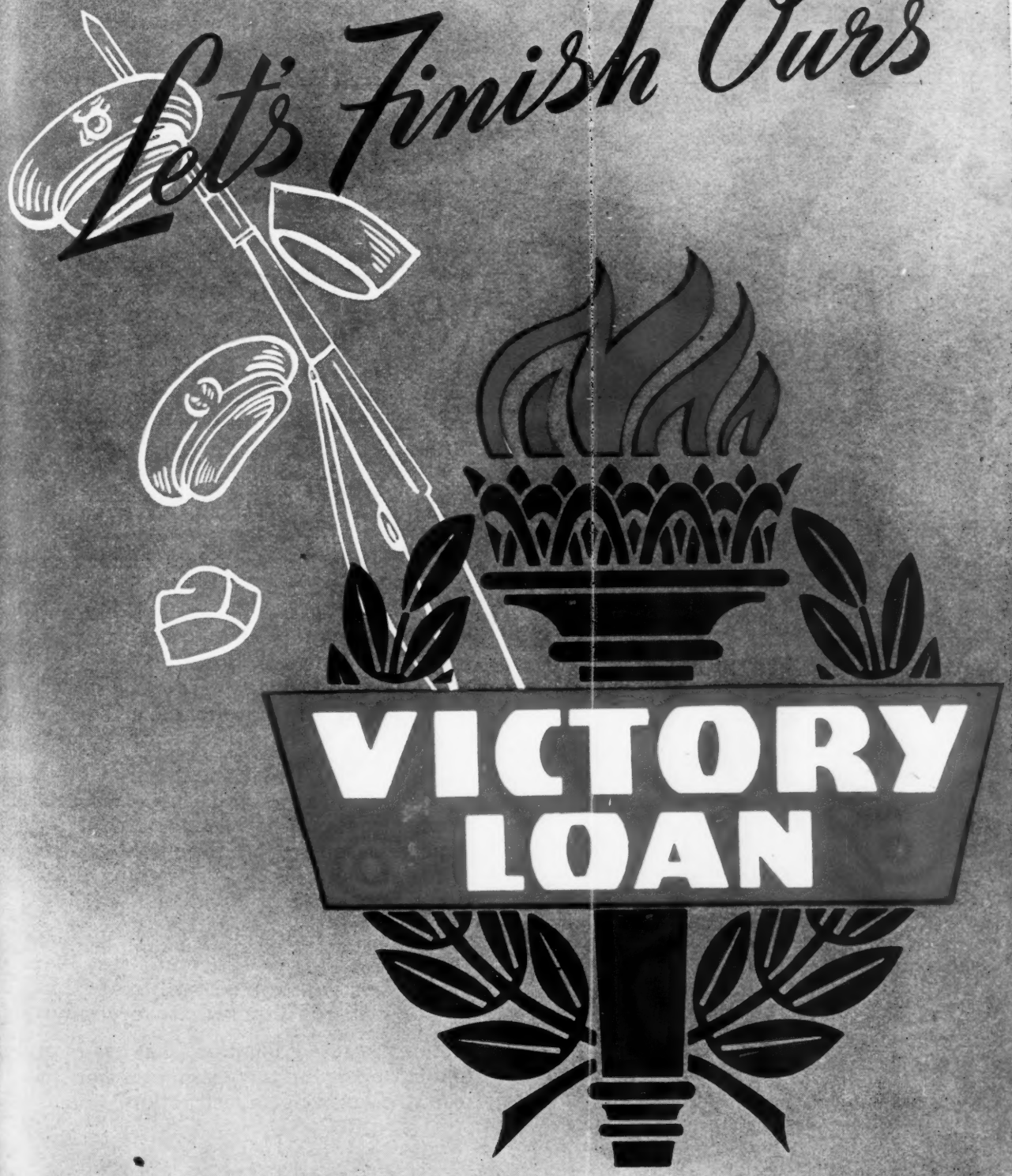
A number of valuable franchises are available in high potential territories.

WARD LAFRANCE

THE NEW STANDARD FOR HEAVY HAULING

THEY FINISHED THEIR JOB . . .

Let's Finish Ours



This advertisement contributed by the

BOSTON WOVEN HOSE AND RUBBER COMPANY · CAMBRIDGE, MASS., U.S.A.

LIKE A "300" BOWLER

FORM-SET ROPE IS *Relaxed*

There was the bowler who, on the threshold of the magic 300, went out for a walk before his final roll. Tension was high, but the walk around the block settled his nerves. On the all-important roll, the pins went down and the perfect game was his . . . *because he'd relaxed!*

There's a great deal of that same relaxed quality in Form-Set rope. Form-Set is Bethlehem's preformed, and wire rope in the preformed construction has been relieved of many internal stresses and strains; freed of the locked-in tension that sometimes shortens rope life.

The helical wires don't have a nervous urge to straighten themselves out. Cut a section of Form-Set rope and see what happens. *Nothing.* The wires and strands lie just as they were. They don't pop loose or "wicker."

What's all this add up to? First, longer life (savings for *you*). Second, easy handling (something your *crews* will like). Third, better performance (that's what everybody wants).

Remember—no matter what grade of Bethlehem rope you buy, you can get it in the *relaxed* Form-Set construction.

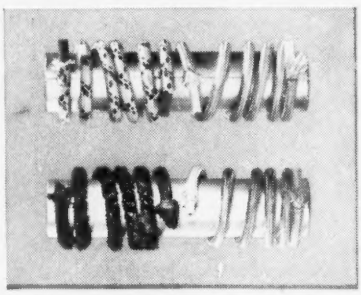
When you think WIRE ROPE

. . . think BETHLEHEM

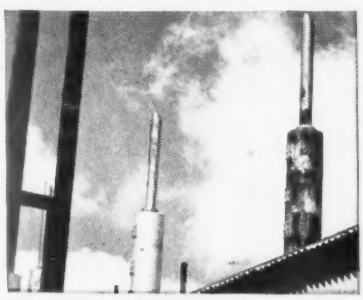
DOW CORNING

SILICONES

revise old concepts of the properties of materials



Cable insulated with Dow Corning Silicone rubber (at right) shows no change after one hour at 250° C., in contrast with organic rubber, which has melted and exuded freely through the braid.



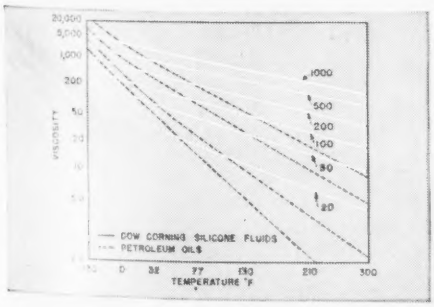
The excellent condition of the stack at left, protected with silicone based paint, indicates the ability of such finishes to withstand moisture, oxidation, ultra-violet rays and temperatures up to 500°F.

American industry has been quick to prove the outstanding advantages of Dow Corning Silicone products. The greater heat stability, inertness to water and chemicals, and the excellent dielectric properties of these high polymeric substances radically change old concepts of the properties of materials.

Among DC Silicone products commercially available are: Fluids notable for low rate of viscosity change over a wide temperature range; Lubricating Greases for service at temperatures down to —70°F. and up to 400°F.; special Stopcock and Plug Cock Greases; Varnishes and Resins for impregnating, coating and bonding, and for waterproofing asbestos, mica and Fiberglas cloth; Silastic*, a rubber-like silicone material for molding, coating, extruding and laminating.

Inquiries are invited.

*TRADE MARK, DOW CORNING CORPORATION



Here is graphic illustration of the fact that Dow Corning Silicone fluids undergo strikingly little change in fluidity over a wide range of temperatures.

DOW CORNING CORPORATION
MIDLAND, MICHIGAN

New York Office: Empire State Building

Dow Corning

FIRST IN SILICONES

THE JOY 32" SHUTTLE CAR

can be *Quickly Serviced*

with a minimum of "time-off"...

Joy equipment designers consider each detail of construction thoroughly from the viewpoint of on-the-job servicing of that particular unit. As a result, not only the Joy 32" Shuttle Car, but all equipment coming from our plant, incorporates time saving features for check-servicing or repairs—resulting in a minimum of lost production time.

Joy 32 in. Shuttle Car with protective front sideboard attached.

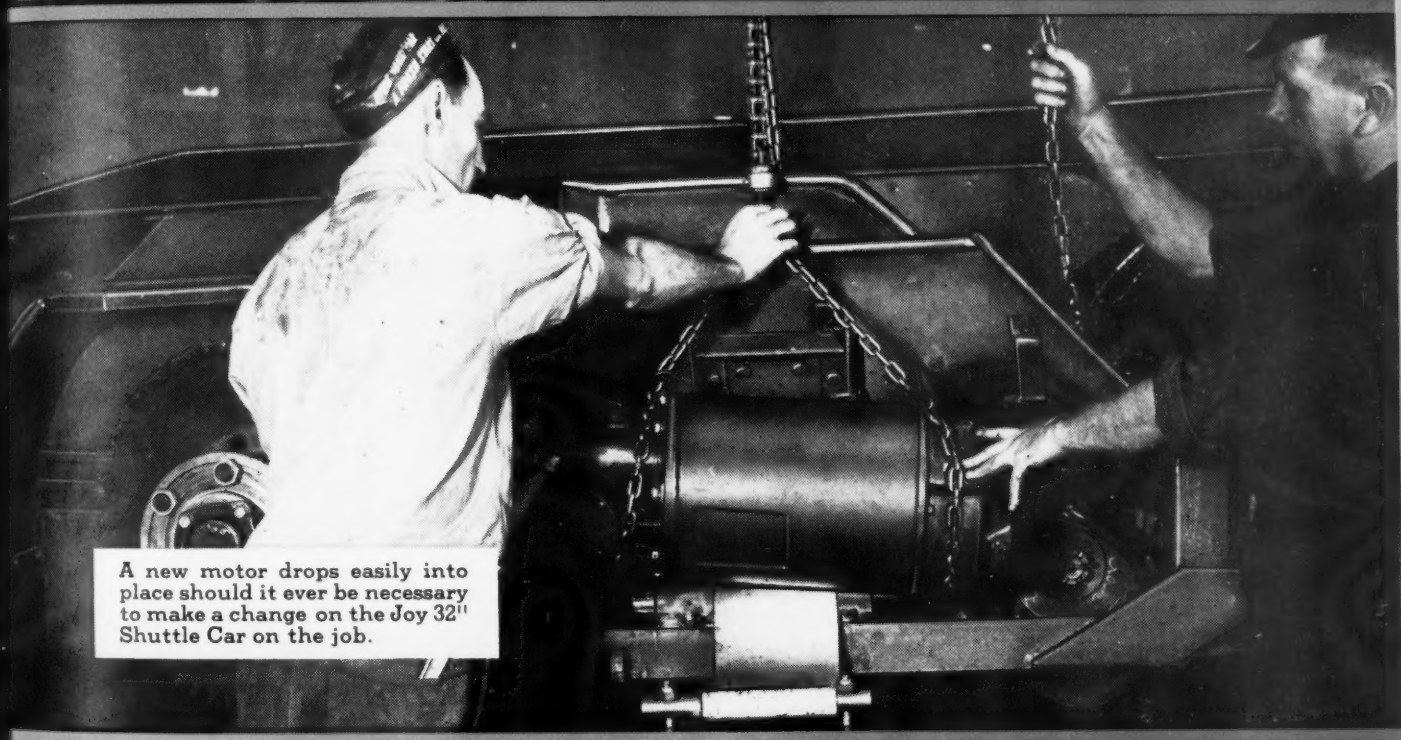
CALL IN A JOY ENGINEER

NO OBLIGATION

JOY MANUFACTURING CO.

FRANKLIN, PA.

Side panels may be quickly removed from the 32" Shuttle Car power control box to check assembly of units within.



A new motor drops easily into place should it ever be necessary to make a change on the Joy 32" Shuttle Car on the job.

Large rubber tired wheels come off quickly—as easily as those on a conventional automobile, eliminating lengthy delays.

Yours for "SAFER" safety

Safety is the keynote of all blasting operations — and true safety comes from a combination of good common sense plus first-rate supplies.

Ensign-Bickford, with 109 years' experience backing it up, is today producing just such supplies — dependable and uniform Safety Fuse that lives up to its name.

Correct use of Ensign-Bickford Fuse will avoid costly misfires. And correct use is summed up in these 6 simple rules:

CUT Safety Fuse end clean and square with a sharp blade, SEAT it firmly in the cap, and CRIMP the fuse and cap securely, using a crimper. CENTER the cap accurately in the primer cartridge, and TIE the fuse so that it cannot slip. Above all, don't short-fuse! Leave yourself plenty of time to walk, not run, to a place of safety. The SAFE way is the RIGHT way!

Since 1836
Also Primacord-Bickford Detonating Fuse

THE ENSIGN-BICKFORD COMPANY • Simsbury, Connecticut

S-20

ENSIGN-BICKFORD

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

Ivan A. Given, *Editor* NOVEMBER, 1945

Also Obvious

"OBVIOUSLY the government has failed to settle the matter. Obviously, the action is taken in the public interest." In offering these reasons for ending the strike called to force unionization of mine supervisors, the officers of the United Mine Workers of America neglected a further obvious fact: no strike was ever less justified or more clearly a violation of the contract. It was a bald attempt to use the power vested in union leaders by organization and federal favoritism to collar additional dues payers and build a stronger organization for forays against other industries.

The shape of things to come is still unknown but if past history is any criterion there is every reason to believe that calling off the strike was no more than a tactical withdrawal—that the mine-union heads will have new and equally unpleasant surprises for the industry and the public in the not-too-distant future. Coming close on their plea to the anthracite miners to increase their productivity and thereby give the industry a much needed lift, the contrast presented by the supervisory strike is even more glaring—and gives rise to considerable doubt as to whether the union leaders were indulging themselves in more than an empty gesture in the anthracite appeal. Intensification of the campaign to split and restrict management is hardly reassuring to those who perhaps were beginning to hope that a new era of constructive cooperation was at least to be seen in the offing.

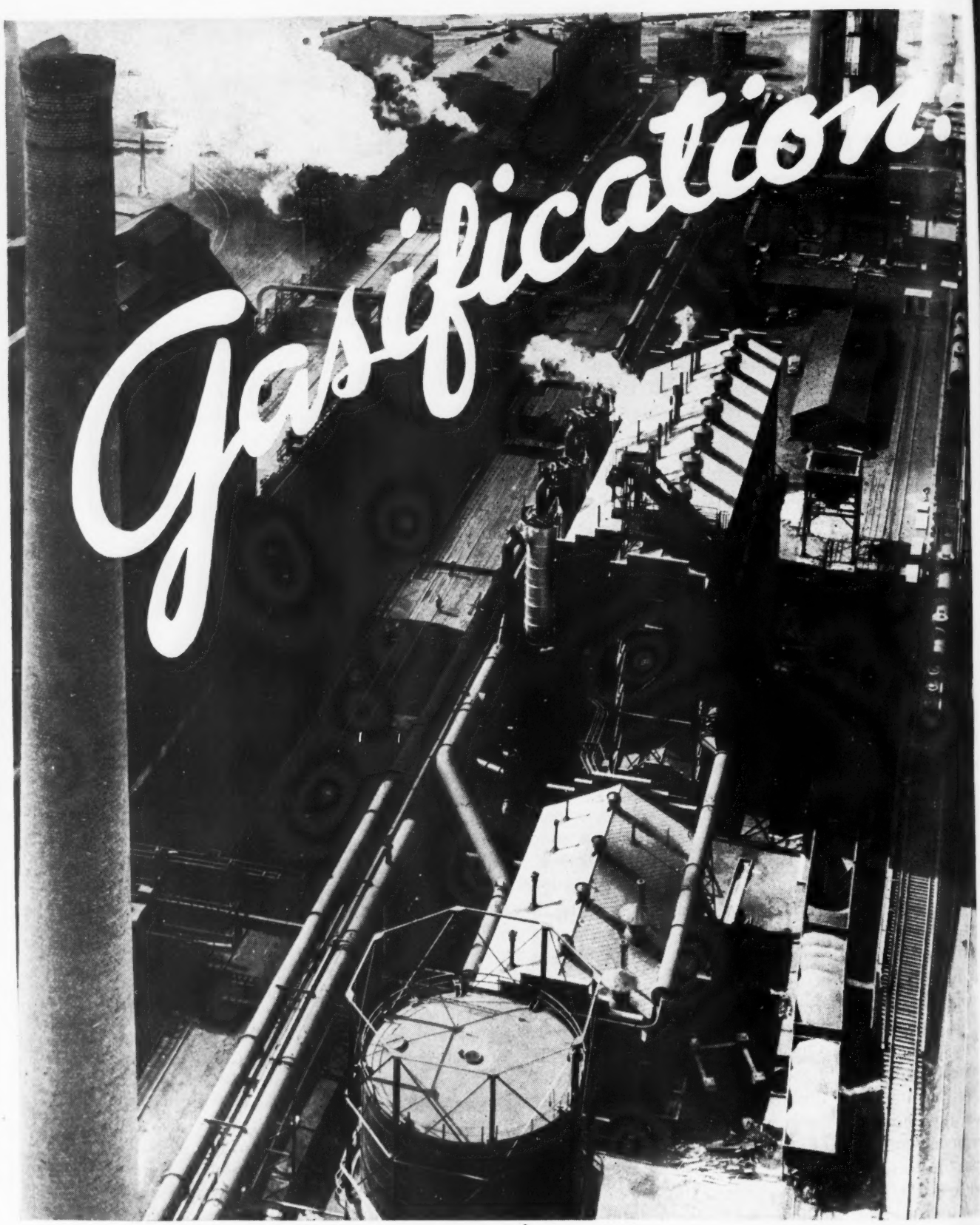
Organization already has been alluded to as a factor in the supervisory strike and in other troubles that may come in the future. Organization can and has accomplished a great deal of good and is, of course, the magic word that opens all doors in Washington. That, however, does not alter the fact that, without controls and leadership conscious of its responsibility, labor organizations can be operated just as easily against industry and public interest as for it. In the long run, failure to consider industry and public interest cannot but adversely affect the organization's membership, yet union leaders today generally have adopted and improved upon all the practices they formerly taxed business with, including bitter opposition to any curbs or controls in the public interest. In view of the campaign of the U.M.W. officials to use coal miners and the coal industry as clubs in organizing other industries, their attempts to hamstring management and their willingness to toss the contract out the window when it suits their purposes, it is only logical to ask if these officials really are advancing the best interests of the union's membership, the industry and the public.

It is difficult to see how unionization can result in anything but regimentation and loss of opportunity for the supervisors. It is even more difficult to see how, if such unionization eventually were to be forced on the supervisors, management could function with the efficiency that will be necessary in the future. From every standpoint, therefore, this campaign of the union officials should be opposed to the utmost.

No Change

"ACHIEVEMENT of industrial harmony" was the goal announced by President Truman in calling the industry-labor conference which began meetings in Washington Nov. 5. But even before it got under way evidence was piling up that the Second New Deal was combining with labor leaders to put the squeeze on industry, thus continuing a practice that experience already has proved does nothing to promote such harmony. One turn was given the screw in a report by a carefully unnamed group of economists in the Office of War Mobilization and Reconversion that industry could raise wages 24 percent with no increase in prices or reduction in earnings. Truman's recommendation of Nov. 2 that rates of all federal employees be increased 20 percent put on a little more pressure in addition to that exerted by a parade of government officials advocating an increase in the statutory minimum wage. Henry Wallace, Secretary of Commerce, ran a bad third, incidentally, with a report that industry could grant 10 percent with no price increases or with no profit reduction.

The conclusion is that Truman's plea of Oct. 30 for "reasonableness" and "give-and-take" left the situation virtually unchanged. In other words, federal officials still take the word of the unioneers as to what is "reasonable" and who should "give" and who should "take." Congress shows some signs of giving the federal-union combination some attention but until it acts or the public appreciates the facts, it seems that employers must decide as best they can what to do about a not-too-gentle "invitation" to come forward and shower down at the behest of union officials whether or not bankruptcy is the result.



WHERE COAL BECOMES PUSHBUTTON HEAT—Gasification makes coal into clean, convenient, automatic fuel. Intensified research seeks improved and more flexible gas-making equipment for lower cost and higher B.t.u. content with expanded markets as the goal.

A Chance for Coal at an 80-Million-Ton Market

Coal can supply gas and gas can furnish clean, completely automatic home heat and other services free from delivery and storage troubles. Needed is a cheap, practical process of complete gasification. The search is under way and intensified efforts can make it bear fruit quicker.

THE GLASS AND PLASTIC postwar house of the glamour ads, with its private helicopter hangar, television set, electric eyes and pushbutton controls, may look to the average person like something out of a bad dream, but to anyone who makes his living from coal it offers food for thought.

The coal man is not much concerned with glass-brick fish ponds, revolving sun decks and remote-control phonographs. His concern is the basement, and the basement of the House of Tomorrow always is depicted as a bright, cheerful, ample room where the little woman can sew, the children can play, or the old man can hoist one or two with a few cronies. No furnace? Well, if there is one it will be well concealed, and certainly no provision has been made for anything like a coal bin or an ash can.

Automatic Heat the Trend

Perhaps none of us ever will be able to afford the House of Tomorrow, but what progressive coal men are studying is not the extreme example but the trend. Builders, architects, interior decorators, designers all agree that the trend is toward fewer workaday chores in housekeeping. To the coal man that means but one significant thing: automatic heat.

Automatic heat brought the coal man some problems. First he was inclined to fight it. That concept changed rapidly to the more modern and sensible approach of trying to supply it. Stokers were developed and service was increased and improved. As competitive weapons both served their purpose admirably, and still do. But now an entirely new theory of automatic heat has been advanced in which the coal man, far from having to devote his time and talents to catching up with the parade, becomes its leader.

Convenience the Goal

All this stems from a wider definition of what "automatic" means. The House of Tomorrow, or even its modified and more useful version, will demand a heating system (and probably a cooling system) in which the householder not only is furnished automatic temperature controls but that requires no storage of fuel in the home. The accent will be on maximum convenience at naturally reasonable cost. Three possible approaches to such conveniences are:

1. Community heating plants also providing hot water.
2. Gas service for heat and also air-conditioning, hot-water heating, cooking and refrigeration.
3. Electric heating with air-conditioning, hot-water heating, cooking and refrigeration plus lighting.

Community or district heating plants have real possibilities that coal producers, research men and equipment builders now are exploring. A number of such plants are in operation, including some in new communities fired with oil. Electric home heating is another possibility that is growing in popularity, although equipment, it seems, is yet to be fully developed. Gas offers equal convenience and has been proved practical by years of service. It is another string to coal's bow and therefore is equally deserving of serious study and research into gas making and distribution.

Coal is by far the most abundant and reliable source of gas. Coal and gas men have an equal stake in the important domestic, home-heating and commercial market, where oil undoubtedly will be doing a business equivalent to 50,000,000 tons or more of coal as soon as rationing restrictions are relaxed. Coal also is concerned with the natural-gas side of the picture since this competitor, among other things, gets the equivalent of 30,000,000 tons out of the domestic and commercial market.

Tonnage Prospects Substantial

A substantial part of this tonnage, it is logical to expect, could be won back by low-cost high-B.t.u. gas from coal, although even halting further inroads would be a real achievement. That is the reason why gas utilities and progressive coal companies alike are spending hundreds of thousands of dollars and employing the best technical brains to study the various processes of gasification of coal. Their common goal is an inexpensive and reliable method of obtaining a high-B.t.u. gas from our most plentiful natural resource—coal. If they have not finally reached that goal, at least it is in sight.

For about the past 20 years fuel oil has traded on its principal argument of convenience. Yet it provided neither as clean a heat as gas nor as steady a heat as coal. But despite those shortcomings it increased its heating market

from about 25,000,000 bbl. in 1929 to 168,000,000 in 1942. A slight recess, the first since fuel oil became a serious competitor in the heating market, was noted in 1943, but that was due to war restrictions rather than to any slump in popularity. It does not seem at all fantastic to predict a fuel-oil market of 175,000,000 barrels after the war, which means, at four barrels per ton of coal, a potential 44,000,000-ton coal market. Add to this several million barrels in range oil and liquefied petroleum gases and it is immediately apparent that through gasification coal could set itself up to make a strenuous bid for a 50,000,000-ton-a-year market—a market in which the profits normally are highest. In addition, coal also would have a better chance at the domestic and commercial market supplied by natural gas, plus other natural-gas outlets now running the equivalent of 30,000,000 tons or more a year.

If coal can be marketed economically in the clean, ashless form of gas without concern over the sale of byproducts, the coal industry will have an almost unanswerable argument in the battle for the retail, commercial and small industrial heating markets. But can it be done, and by whom?

Distributors Ready

To answer the second question first: the logical distributors of coal gas are the people who are doing it now—the gas utilities. In the main they are anxious to undertake the task—anxious enough, at least, to be conducting exhaustive studies into both costs and processes of marketing coal gas for domestic and other retail heating use.

But the gas utilities are not the only ones capable of marketing gas. At least some coal men are looking very thoroughly into the prospects of entering the field of the sale of coal byproducts themselves. Some of them feel so strongly about it that they think it is the only complete answer to the increased sale of coal after the wartime demand declines.

There is no reason, except the capital investment, why coal cannot be turned into gas at the mines and piped to centers of distribution. At the moment the cost of apparatus for complete gasification would eliminate all but two or three of the biggest companies from undertaking any such idea. But the reduction of those costs is one of the basic objects of research into gasification. The prospect looks more attractive when transportation costs are considered. It has been estimated that it costs $\frac{5}{10}$c. to transport 1,000,000 B.t.u. of natural gas 100 miles, while it costs 1½c. to transport 1,000,000 B.t.u. of coal the same distance. Of course, manufactured gas, because of its lower B.t.u. rating, might cost more to transport than natural gas, since pipelines would have to be larger and pressure increased.

The answer to whether it can be done or not has already been found in Germany and other European countries. But American scientists must be far more concerned about economic factors than the students of late totalitarian states, and the answer, in the United States at least, is: "Yes, it can be done, but there are still many problems to be settled first."

Outlook Is Promising

Unemotional technicians in both the gas and coal industries will make no direct forecasts, but they agree that the development of a complete and practical gasification process for coal, given certain favorable factors, is "very promising." They admit freely that they need to know more about the various processes, and some of the leading experts have traveled to Europe to see what they can learn from the ashes of German technique. Some feel that too much effort is being made to put the cart before the horse, to attempt to build apparatus to gasify coal without first having a thorough knowledge of the chemical reactions of the gasification process. Others qualify any statement on the future of gasification with provisions on the costs of the component materials, both coal itself and oxygen. But they all agree it can be done within the next few years at a reasonable cost.

The only thing that holds the gas utilities back from making a strenuous bid for the retail heating market is peak-load capacity. If they undertake retail heating, they must have the capacity to deliver during the heating season, and that capacity lies idle, depreciating and earning nothing, during the summer. Two schemes have been advanced to overcome this: summer air-conditioning and cheaper capital equipment, with the latter much more in the minds of the gas people than the former. Too few homes can be adapted to air-conditioning and too few home owners can afford it. It is not being neglected, but lower-priced gasification equipment seems a better immediate answer.

A further deterrent in increasing capacity of present equipment is that the more coal gas is made the more coke and other byproducts the utilities must sell. Since normally they are selling both fuels in the same market, they too often end up competing against themselves.

Low-priced equipment, however, if it would permit the gas companies to get into the domestic field immediately after the war, might also pose one more threat to coal, because the equipment that is ready proposes the use of heavy hydrocarbons rather than coal as a cheap source of good gas.

Gas utilities technicians believe that after the war there will be an abundant supply of propane and butane—products of the manufacture of high-test gasoline. Equipment to make a rich gas from the heavy hydrocarbons can be constructed for about $50 to $75 per thousand cubic feet of daily gas capacity, whereas a water-gas machine would cost from $150 to $200 and coal-gas apparatus would run as high as $500 for similar capacities.

Gas experts confess frankly and quickly that domestic heating gas from heavy hydrocarbons is not the answer they are seeking, since they are fearful that the supply may be shut off for one reason or another—lack of domestic petroleum, high cost of imported petroleum or retsrictions on the use of domestic petroleum for security purposes. They still want to know how to make gas from coal cheaply with no byproducts. But the heavy hydrocarbons have two enticing advantages: the process is understood, tested and available and the capital investment cost to meet peak capacity would be relatively low. Furthermore, such plants could be built in small units and run only when heeded, thus saving on storage costs, which now are high with coal gas.

Research Necessary

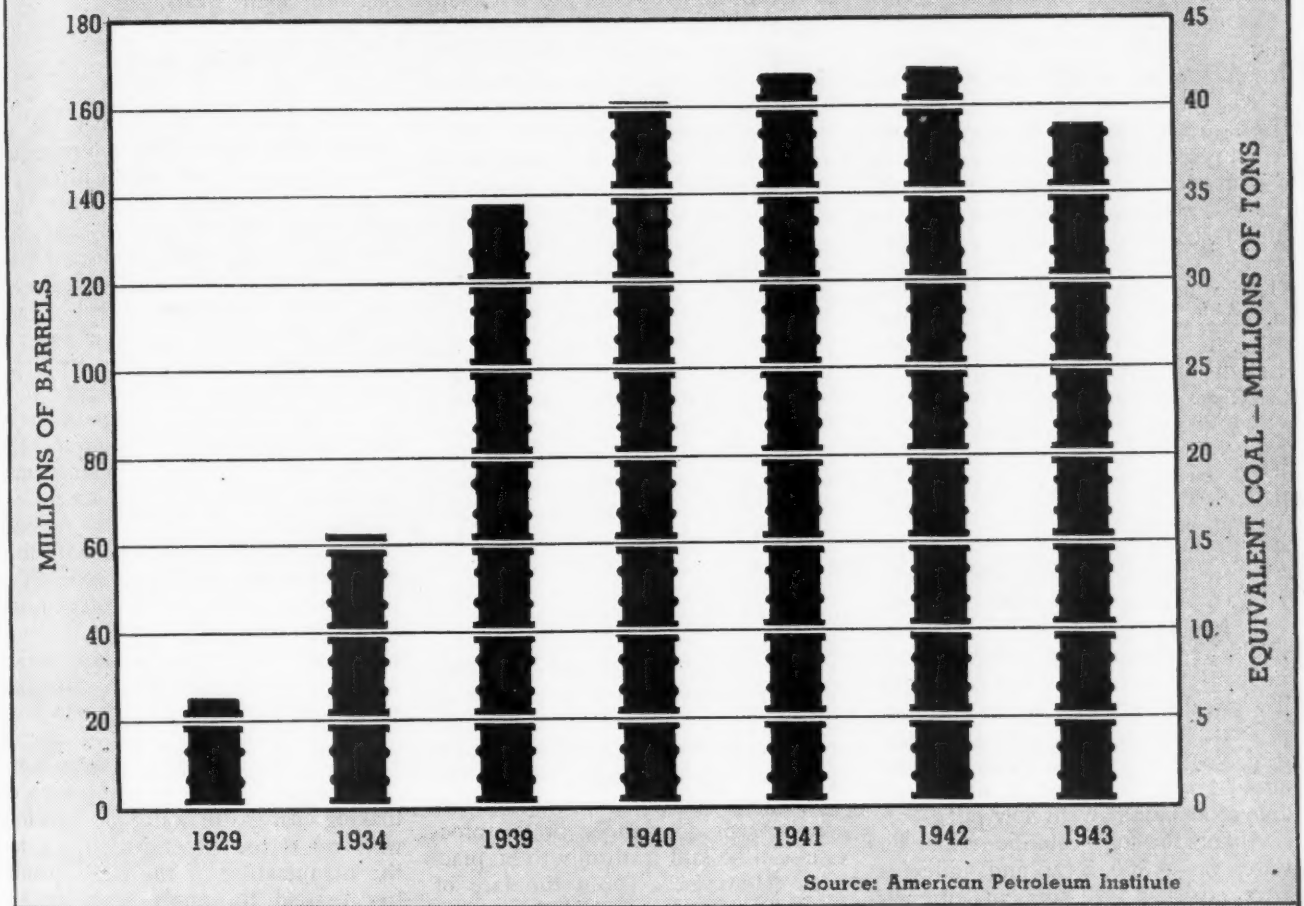
But even though this may present another immediate problem for coal, it is not the ultimate answer and indicates only that research into complete gasification of coal must be expanded in order that scientists may have a better chance of arriving at the answer sooner.

The four most promising processes so far studied in the United States (and our knowledge of all of them may be greatly increased by European data) are, technical experts say, the so-called fluidization process, the catalytic enrichment of water gas, high-temperature gasification with hydrogen and the Lurgi process, which uses oxygen under high pressures.

The fluidization process has attracted wide attention recently, although it is not new. The principle is to employ powdered coal, blow oxygen and steam through it so that it boils like a liquid and gasify it in that form. This obviously presupposes

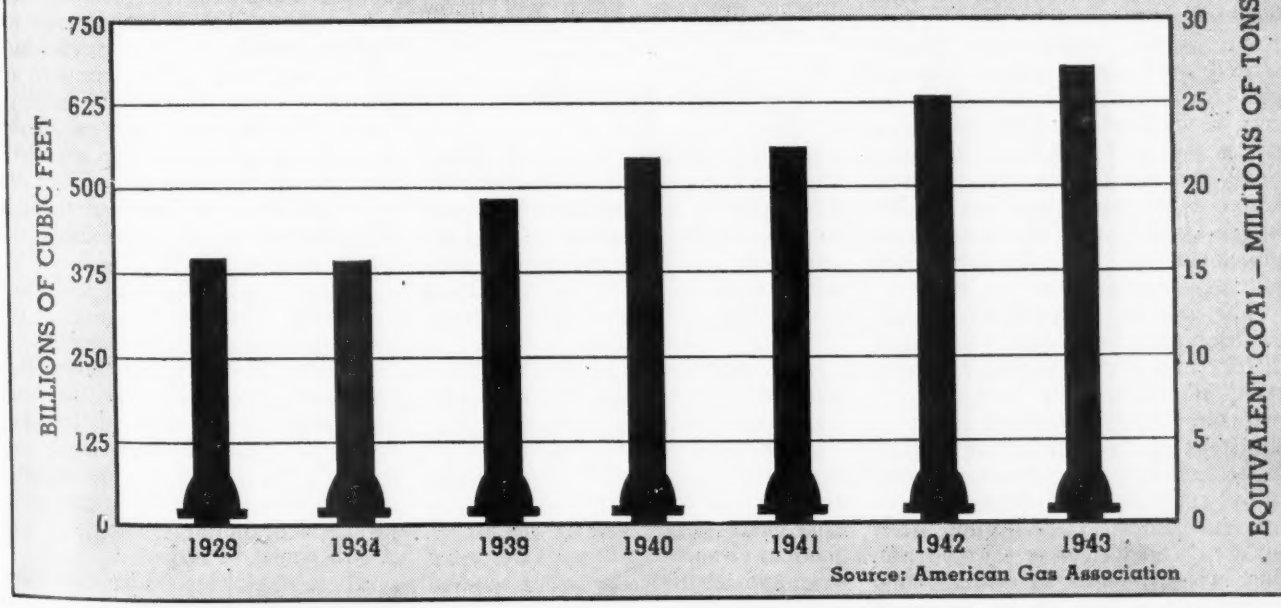
WHERE COAL GAS LOOKS FOR BUSINESS

HEATING OILS — Domestic and Commercial



Source: American Petroleum Institute

NATURAL GAS — Domestic and Commercial



Source: American Gas Association

BUILT ON THE CONVENIENCE ARGUMENT—Oil increased its domestic and commercial sales (largely for heating) over 500 percent between 1929 and 1943; natural gas, 40 percent. Through low-cost high-B.t.u. manufactured gas, coal has an opportunity to bid for this rich market, aggregating, with other home applications not shown, over 80,000,000 tons a year, by furnishing pushbutton heat plus air-conditioning, hot-water heating, cooking and refrigeration.

a cheap and abundant supply of oxygen after the war, but most gas chemists seem to feel they can surmount that problem if other "bugs" can be eliminated. While non-caking coals are preferred for this process, there is no basic prohibition against the use of any coal. The process produces a rather low-B.t.u. gas that could be enriched with a catalyst. However, one of the main reasons it has attracted such wide support from chemists lately is that the gas can be "scrubbed," its sulphur and carbon dioxide eliminated during the process, due to conducting it under high pressures. This naturally reduces the cost. Tar would be a byproduct from such a process, but scientists say the quantity can be controlled either by a catalyst or by controlling the heat.

Oil a Competitor

The catalystic enrichment of water gas is nothing more than using a catalyst to convert "blue" gas to methane, which is the chief constituent of natural gas. The methane then becomes the enriching agent rather than oil in the ordinary blue gas that is made in many places in the United States. Technically, it is a relatively simple process and scientists know a great deal about it, but gas utilities cannot afford to use it as long as oil is available at a comparatively low price.

About the top calorific value for water gas is 300 B.t.u. and, unless it were enriched, the present city gas mains would not have sufficient capacity to carry it and tremendous new investments for distribution systems would be required. The use of a low-B.t.u. gas, however, has been demonstrated as feasible where the gas economy is based almost entirely on coal, as in England. City delivery of gas as low as 450 B.t.u. is common there, and at least gives rise to speculation as to what may be possible in the United States if and when replacement of present distribution systems is necessary.

The catalytic enrichment of water gas leads to another and more immediately interesting speculation, however, and that is the production of methane catalytically, which is one of the steps in the enrichment process. If methane can be produced economically by catalyst, why bother with adding it to water gas? Why not use it by itself? Such a process would produce what amounts to manufactured natural gas with a B.t.u. rating of 1,000, ideal both for transmission and distribution.

High-temperature gasification with hydrogen has been the subject of recent scientific monographs. It is still in the experimental stage and embodies the direct action of hydrogen on coal. It becomes an attractive process when it is realized that some work with it has produced gas of as high as 800 B.t.u. However, it is not adaptable to all coals or, to be more precise, it is not yet known whether all coals can be adapted to it. Experiments are being conducted on the process at Purdue University and other places.

The Lurgi process has been widely used in Europe for some years, but requires a constant and cheap source of oxygen to be practical in the United States, and higher grade coals have been found to give comparatively lower-B.t.u. gases. Brown coals have been used almost exclusively for this process in Germany. The process uses oxygen under 300-lb.-per-square-inch pressure, produces more methane than other gasification processes, resulting in a higher heating content—about 500 B.t.u. Tar is a byproduct but there is no coke. American scientists are endeavoring to obtain more data on the Lurgi process from European sources and much study and thought is being devoted to it in this country.

Gas can be made from coal with little or no byproduct by any or all of these processes. As far as the laboratory is concerned, they all are practical. But the laboratory is not the accounting office, and unless the costs can be kept down none of the processes can be said truthfully to be practical. However, even in the face of incomplete operating data the American Gas Association is proceeding with an investigation into the costs of the various processes, which will throw some light on the situation.

Oxygen the Problem

All the processes have some objections to them. For instance, both the Lurgi process and fluidization require oxygen. Bright prospects are held for cheap oxygen after the war, which would make its use in the gasification process practical, but at today's prices it would be prohibitive.

As a matter of fact, the high-temperature carbonization of coal, with the production of premium coke that can be marketed to industrial and domestic consumers, is economically sound in many localities. Where the coke market is restricted, the use of modern carbureted water-gas sets using coke and relatively low-priced residual oil is common.

Both of these processes, or a combination of the two, are well established in American gas practice, and a properly balanced plant can vary the relative quantities of coal and oil used. Any of the new processes must, as a result, offer advantages in investment and operating costs over methods that, while they have their drawbacks, nonetheless have proved practical over many years.

Ready to Go

This does not mean that the gas utilities are static. They are reviewing many processes, not only with an eye toward developing one that will prove the ultimate answer but also, and equally important, to discard those that will not work. They are ready and willing to enlarge or replace their plants. Much of their equipment is obsolescent, much of it is too small and at least some of it has been worn out under the taxing demands of a wartime economy that allowed little opportunity for proper maintenance and almost none for replacement.

But while they are anxious to modernize their plants and methods they are proceeding with commendable caution and want no mistakes made in committing themselves to a course that may later prove unsound, which raises a question in which coal men are taking, and will continue to take, a vital interest.

Gas utilities are almost unanimous in declaring that the present process of making coal gas or water gas enriched with oil is too expensive to use for the manufacture of the large quantities needed to supply house-heating requirements, due in large measure to the poor load factor. They also are almost unanimous in believing that oil supplies will some time become too tight to permit its use as an enriching agent. But, they are beginning to ask themselves, would coal be an improvement? Not that they have any doubts as to the quantities of it in the earth, but recent developments within the coal industry itself have led them to ask whether it is a dependable and economic raw material.

The utilities companies look with skepticism, if not with alarm, at the growing frequency of stoppages in the coal fields, at continued increases in coal prices year after year as the result of successful union demands for more wages. To gasify coal efficiently and market it profitably the gas industry needs a cheap and uninterrupted supply. It is beginning to wonder a little if coal would be either.

There is growing evidence at every hand that the postwar trend in heating will stress convenience more and more. This is particularly true of the young home builders, the "pushbutton" generators, who will comprise

SERVICE WITH SATISFACTION—By eliminating storage and delivery troubles and providing fully automatic heat, manufactured gas permits making basements truly "modern."

the bulk of the new home market. They are going to insist on convenience and comfort, and they will not have too much money to spend to get it. If coal cannot supply the answer, some other fuel will. But coal can if it can find a cheap and practical method of distributing its product in the form of gas.

There cannot be much argument about the convenience of gas heat. With thermostatic controls, it requires no attention from the beginning of the heating season to the end. It leaves no ash. It is clean and noiseless. There is no problem of either a bin or a tank. There is no worry about the supply running out on a cold night because the householder has forgotten to place an order. It can be economical, especially in a new, tight home. It is growing continually in popularity, house heating with manufactured gas having increased from less than 15 billion cubic feet in 1929 to 85 billion cubic feet in 1944. Some Eastern gas companies are now at the stage where they are rejecting orders for house heating until they can obtain materials to increase their capacity.

Natural gas is a threat, of course, but need not be a permanent one to the coal industry's domestic market plans. In the first place its life expectancy is short at best, and in the next place more and more efforts are being made by producing States to keep the declining stores of gas within their own borders. Installation of individual gas producers in homes has met with little encouragement since they are generally considered unsafe, noisy and smelly, but above all they do not provide the answer to the convenience argument.

Coal's Opportunities

What does all this mean to coal mining and its employees and customers? What can coal do to capitalize on the situation? What can it do, in other words, to help promote the sale of coal?

Most leaders in the gas utilities industry are anxious to join with coal in finding a cheap and efficient means of complete gasification. They believe there is a common goal which will bring profits, customer satisfaction, and a steadier market and more constant production schedules for both industries. They feel naturally, however, that if there are to be mutual benefits, there also should be mutual effort.

Free exchange of ideas and information, an interlocking of research efforts into gasification by both industries, might conceivably shorten the distance to the ultimate goal. Research is expensive and efforts will only be wasted unless it is supported generously enough to employ the best brains and the best equipment to learn all there is to know about all gasification processes and submit them to exhaustive tests and studies. The two industries co-operating together might not only cut down the time but the expense as well.

Enlightened coal men no longer attempt to fight public demand; they attempt instead to satisfy it. Certainly one of those demands in which the coal industry is vitally concerned is that for automatic heat. In gasification of coal two great industries have an opportunity not only to help themselves but to bring a fuller measure of comfort, convenience, health and satisfaction to American living in the days to come.

TONNAGE RAISED

By Adoption of Shuttle-Car Gathering

Year's Trial Proves Shuttle-Car Advantages—Tons per Shift Nearly Doubled—One Transfer Station Serves a 22-Room Group—Mine Will Be Completely Equipped With the New Units to Increase Its Efficiency

WITH a 6- to 6½-ft. vein of No. 5 coal and generally good mining conditions, No. 2 mine of the Knox Consolidated Coal Corp., Bicknell, Ind., has completed a year's experiment with modern methods of producing coal. The result is that this mine is being converted to 100-percent shuttle-car gathering as rapidly as equipment becomes available.

Six Units Planned

The decision to try shuttle-car gathering was taken something over two years ago. For this experiment an 11BU loader, two Joy shuttle cars and a Joy transfer conveyor were purchased. The shuttle cars are battery-powered, two-wheel drive, two-wheel steer, with a nominal capacity of 6 tons but are loaded to 5 tons in practice. The switching locomotive serving the transfer station, as well as the relay locomotive, are General Electric 7-ton cable-reel units. Other loaders in the mine are 5BU Joys, loading into 3-ton mine cars handled by the same type of locomotives. Ultimately this mine will be served by six loading units (12 shuttle cars) like those in the test set-up.

The working panel for this set-up was originally laid out with one pair of headings and 33-ft. rooms on 53-ft. centers turned at right angles off each heading and driven 400 ft. to the 100-ft. pillar surrounding the panel. The rooms are worked in groups of eleven off each heading, making 22 for each transfer-station location. The transfer station is near the center of the 22 rooms. The normal panel is 33 rooms deep, but along the property line this may not work out evenly and more or fewer rooms may constitute a panel. It is customary to drive the panel entries to the panel boundary and work out the groups of rooms on retreat.

Experience suggested a modification of the original plan, which has proved advantageous. The accompanying sketch of a working section indicates the headings as originally driven, as well as two additional headings, designated as "A" and "B," made by driving crosscuts in line. The purpose of the "A" and "B" headings is to accommodate mine tracks and shuttle-car roads without interfering with ventilation, which is largely the function of the original entries.

Mining machines have 7- and 8-ft. cutter-bars. No water is used on the bars in the process of cutting coal. After shooting, the coal is wet to allay dust while loading and at the transfer station. For this purpose water is piped into every third room, where a 200-ft. garden hose is used to sprinkle the coal in the three-room group. Actual room width is not held to 33 ft. At times rooms are widened to as much as 37 ft. The average fall of coal is about 65 tons.

The 300-amp.-hr. batteries on these shuttle cars last four or five hours and are changed during the shift in 2½ min. at the charging station, located near the transfer station. Portable charging stations are made up of a panel weighing 200 lb., which is loaded on a shuttle car or drill truck for immediate transfer to a new location. The 35-kw. a.c./d.c. charging set is mounted on wheels for moving. Connections are made up with portable cables. Thus charging facilities always are at the work.

Length of the shuttle-car haul may be closely approximated by examining the panel plan. The diagonal line of crosscuts is one of the newer features to reduce haul to a minimum. Shuttle-car roadways are treated with calcium chloride to keep down road dust. It has been found necessary to ballast the roads with crushed limestone where water may accumulate.

Cars Loaded Quickly

The panel plan also shows the method of handling mine cars at the transfer station. The rail haul terminates in two tracks at the transfer station. One track is in the haulage heading and the other in the "A" heading. The relay locomotive delivers its trip of empties to the track that happens to be clear—say in the "A" heading—and picks up the loaded trip from the track in the haulage heading. The switching locomotive takes the first four of five cars from the outby end of the empty trip, spots the last car under the conveyor and moves up a car length successively until all are loaded. The loads then are pushed into the haulage heading and the process is repeated. This four-car change is made in 30 seconds.

Men, methods and equipment make results possible. As might be expected, this installation has become more efficient with experience and with the changes experience has suggested. The first 14 working days of June, 1944, averaged a little more than 1,500 tons per double-shift day. This tonnage was consistent enough to justify calling it average production. Up to that time the record production for one day was 2,128 tons—a very satisfactory mark to shoot at.

Comparative loading for rail gathering with the 3-ton mine cars used at this mine, and the type of cable-reel locomotives previously mentioned, produced an average of 400 to 450 tons per single shift, with a maximum loading record of about 600 tons for a single shift.

Covering about one-quarter of the area of a complete section of 22 rooms, this sketch shows service-track and shuttle-car haulage routes. The transfer station is located at No. 6 room.

GETTING RESULTS

In Maintaining Coal-Preparation Plants*

Pump and Pipe Life Increased by Special Materials, Alloys, Building Up and Reinforcing — Special Alloys and Proper Handling of the Cloth Among Methods of Reducing Maintenance in Screen Operation

By FRED W. RICHART
Assistant Editor, Coal Age

WHAT to do about pumps, piping and screens is one of the big problems of the preparation maintenance man. This article in the preparation-maintenance series, following up the material on cleaning equipment and coal-handling facilities appearing in the October issue (p. 105), will attempt to present some answers to the questions arising in keeping pumps, line equipment and sizing screens in shape to operate with maximum efficiency. Material in a later issue will discuss practical solutions to the problems of maintaining other preparation-plant equipment.

Pumps and Pipe

Without exception, all equipment used in a coal washery wears out. Pumps offer special problems. Gritty and grainy materials pass through them at high speed, grinding every point they reach and gouging holes in the metal where an eddy is set up. Help can come only from the use of hard-alloy steels, acid- and erosion-resisting metals, rubber linings or lower pump speeds. Even rubber has its limitations. This is one big problem for the maintenance foreman.

Because of the great difference in the acidity of water, the varying quantities of pyrite and other gritty material and the percentage of solids suspended in it, too much cannot be expected from comparing maintenance costs with other plants. However, the study of many experiences is justified for the helpful conclusions that may be drawn. Even individual experience may be of value.

Washery chemists are pretty much agreed on the need for making periodic checks on the pH of wash water. Attention has been called to the fact that changes in the make-up of gob piles and conditions around settling ponds may change the acid condition of the water. Soda, lime, limestone or even boiler blowoff may be used to counteract acidity and raise the pH value to the desired point, say 8½. Repetition of this statement by a chemist is justified: "Water with a pH of 3, or even 4, will eat up equipment—fast."

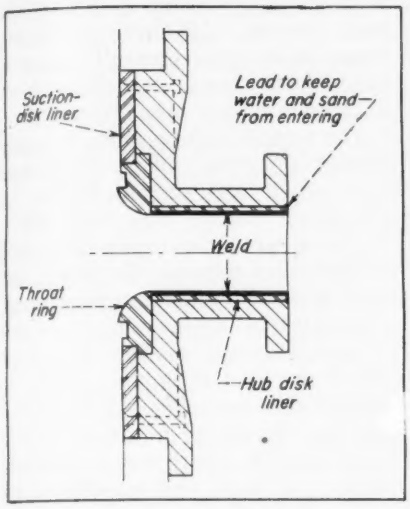
Pumps for circulating water, coal, slurry, sand and gob have tough jobs to handle. Most pumps for these jobs have the casing and suction and hub disks stiffened by ribs to resist warping from shock or the result of internal wear. Shafts usually are mounted in ball or roller bearings to maintain accurate alignment, although some builders of very excellent pumps use ring-oiled sleeve bearings. In any case bearings are far enough away or are protected to prevent water reaching them.

Wear- and acid-resisting materials are used in all pumps designed for these services to prolong the life of pump parts and reduce maintenance cost. Sad experience is moving washery owners to adopt heavy-duty pumps for all these tough jobs. Another detail of value in pumps handling sand or abrasive slurry is rubber lining. Even the impellers may be rubber-coated and the suction throat rubber lined. These rubber linings are rather expensive but they save in two directions; extension of the life of the metal parts and reduction in the labor cost of overhauls. In one plant, life of the rubber-casing lining is six months; in another, the average is one to six months. The life will vary with the percentage and character of solids handled. One manufacturer has stated rubber is satisfactory for pumping solids less than ⅜ in. in maximum size. Above that size the impact breaks the rubber and the water gets under it and rips it out.

An idea that is gaining converts is the use of slow-speed centrifugal pumps for handling solids in suspension. The advantage is that solids striking pump parts at slow speed do much less damage than those moving at high speed. One preparation engineer said of it: "That's smart engineer-

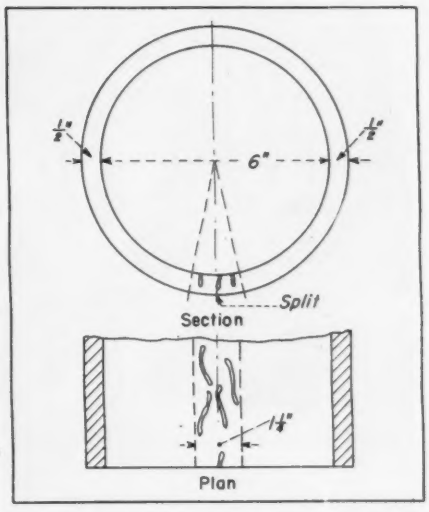
A twin line (one is a spare) carries the 4x0-in. gob from the pump shown in another illustration. The line is turned four times and lasts one to two years.

* Second of a series of articles on practical methods of handling maintenance for increased efficiency in coal preparation.



Building up a pump hub-disk liner by braze welding. When it has to be replaced the suction-disk liner and throat ring are removed and the hub-disk liner is pushed out on that side. Braze-welding rod is used to fill out locally eroded areas in other parts of these pumps, which handle sand. Parts should fit very closely to keep sand from getting a cutting start.

Some piping around a washery cannot be turned conveniently to put a good spot on the bottom. Patching is then necessary.



Cross-section and plan of 6-in. cast-iron pipe showing grooves made by slurry. After two years, pipe split at bottom.

ing." The use of slow-speed pumps is on the upgrade.

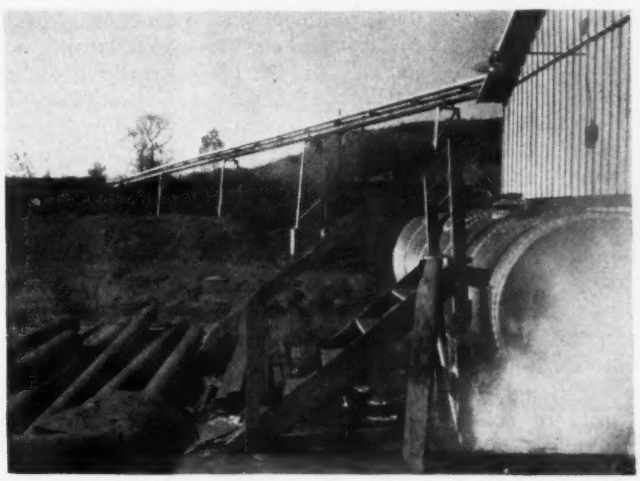
The V-belt drive makes further gains because of the sound engineering behind it. For example, if the quantity of wash water originally was incorrectly estimated, or if the wear in the pump reduces the supply, it may be easily adjusted by changing a pulley. Impellers wear out first, affecting the water supply or other operations. Some pumps are designed to facilitate the quick removal and replacement of the impeller.

Conveying small coal vertically by pump rather than by chain elevator is practiced in at least two plants. Pumping is not limited by distance, direction, curves or angles. The latest installation was a change from elevator to pumping to get away from expensive elevator maintenance. The older installation pumps ⅜ x 0-in. coal to a launder. In this particular case there is too much water to be properly handled, but they get along with the job. The impeller lasts eight months and the casing three times that long.

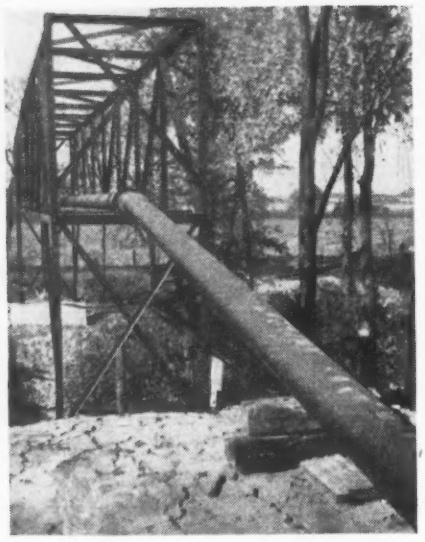
Gob disposal is another possibility with centrifugal pumps that may reduce operating cost. At least one plant is in successful operation and another is being installed. The plant that has been running for some time uses a 6x6-in. V-belt-driven pump to handle approximately 400 tons of 4x0-in. gob per day of two shifts. There are two 8-in. pipelines, one being a standby, carrying the gob more than 1,000 ft. and discharging it beyond a spoil pile. The water flows at an approximate rate of 12 ft. per second to keep the gob in motion. The pipeline is standard steel pipe, is turned a quarter turn occasionally and lasts one to two years. The suction line to the mixing tank is quite short and is of cast steel or a special alloy to resist abrasion.

A few washery plants build up worn and eroded surfaces to prolong the life of shafts, impellers, casings, liners and suction flanges. Wear that is concentrated may be readily repaired by arc welding or metal spraying. One plant operating alloy pumps builds up casings, impellers and other parts with bronze rod to double the life. The process is repeated until the part is worn through at some point. The plant uses sand-flotation equipment. Pumps handling sand are eroded very rapidly. The manufacturers set up the schedule of expected life of parts shown in Table I. This has been found to tally very closely with actual experience. Lead and zinc have been favorite filler metals for badly eroded cavities—something like filling a tooth. At this sand-flotation plant these soft

Double asbestos-cement line for slurry is a new idea that seems likely to prove out.



This 8-in. slurry line (bottom) is constructed so that it may be turned to increase its life.



This new 10-in. slurry line is laid to grade and above ground so that it can be drained daily and patched readily with half-round sections.

metals cut out rapidly. A mortar of cement and silica sand has been found much more effective, particularly behind removable linings.

Pump design and the materials of which they are made have much to do with the labor and parts necessary to keep them in service. When erosion begins it is extended rapidly, due to eddies set up in the water. Spaces behind pump liners become huge cavities once an entrance is effected and water circulation set up. This also may be noted in the wear of pipes, flanges and valves. Any obstruction that diverts a streamline flow starts cutting.

Pumps for clear, neutral makeup or spray water may be standard types made of cast iron if price is important. With the shaft mounted in ball or roller bearings and the glands packed with a suitable soft packing they will require very infrequent attention. Closed impellers are somewhat more efficient in power than the open type. Since impellers wear faster than the volute casing as a general rule, the life of the two may be balanced by making impellers of more resistant material, as bronze or alloy steel. One such pump runs a year without attention. Then it is repacked with metallic packing and is off for another year. Another fresh-water pump with semi-steel casing and impeller has had one new impeller in three years of service. Still another, a heavy-duty pump, has a bronze impeller that lasts three years.

Although there are exceptions, a majority of coal-washing plants discard impellers when they are badly worn and replace them with new ones. That applies to all makes of pumps in the various services around a washer.

Here are some of the things that plants with less difficult wash-water conditions do to prolong the life of pump parts:

One plant with circulating pumps made of a nickel-steel alloy reports an impeller life of three months. The impellers are open type. The open sides of the impeller vanes wear off, enlarging the clearance and reducing water flow. The worn edges are built up with stainless-steel welding rod for an additional three months' service. Other plants report an impeller life of a year for this same alloy circulating wash water.

Another heavy-duty pump handling wash water is fitted with a bronze impeller that lasts for eight months pumping 1,000 g.p.m. This impeller wears badly. No attempt is made to reclaim impellers at this plant. In comparison, a similar fresh-water pump at this plant has had two new impellers in a six-year period.

A 400-g.p.m. auxiliary pump in which the casing lasts but six months will have the next casing hard-coated inside at the point of maximum wear —where the discharge begins at the end of the volute. This precaution is expected to double the life of the casing. Other difficulties at this operation indicate that the water is not so good.

Shaft Sleeve Built Up

Pump shafts wear where they pass through packing glands. One large circulating pump has the shaft fitted with a nickel-alloy metal sleeve where it passes through the gland. When worn, this sleeve is built up with a spray of the same metal, then refinished to standard diameter. This gland is packed with an asbestos packing treated with graphite, which remains soft. This pump must stay on the job, for it is the sole reliance of a plant processing 7,500 tons per day shift. Solids run from 2 to 5 percent. Impeller life is about one year.

A washery engineer of long and varied experience calls attention to the need of a water-seal pressure 10 lb. above the pump discharge pressure to reduce packing troubles greatly by keeping grit out of the stuffing boxes. If a clean water supply of this pressure is not otherwise available, it pays big dividends to install a small booster pump to provide it.

Getting rid of slurry is a problem that worries most coal operators when it has to be pumped. Metal piping and the best of pumps give plenty of trouble. Even a rubber lining doesn't always last long. Figures from two plants indicate that the life of rubber pump linings is six weeks to three months. It does protect the casing if changed promptly when it fails. Such linings are about $\frac{3}{8}$ in. thick and fit the casing quite snugly.

The wear in a slurry pump is largely dependent on the solids, which may run from 10 to 20 percent, and on the size of the pump. The more solids, the more wear; the higher the speed of the water through the pump, the more wear. Considering pump speed, a certain 1,765-r.p.m. pump wore out an impeller every month. It was replaced by a 1,160-r.p.m. pump in which the impeller lasted three months. According to several records made available, slurry pumps with hard alloy steel cases and impellers have an impeller life of two to three months and a casing life of twice that.

One example of a slurry pump with nickel-alloy metal case and impeller may be of interest. This 1,760-r.p.m. pump handles 500 g.p.m. of slurry from a thickener. The water carries 20 percent solids. The coal is from a strip mine. The impeller lasts approximately one year and is scrapped. The casing lasts five years.

Current practice with centrifugal pumps indicates that the following points are given consideration by builders and buyers:

1. Hard steel and even more expensive alloys are used to reduce the effect of erosion and acids.

2. Rubber casing and impeller linings are used to protect metal parts where the solids in suspension are small in size.

3. Because of rapid impeller wear, some pumps are designed for quick replacement.

4. Pumps with open impellers are popular for circulating water; they are less likely to become clogged with big coal.

5. Some builders advise slow speeds to reduce erosion. The advantage must be real, for use is increasing.

6. While ball and roller bearings lead, there are heavy pumps with ring-oiled bearings that are marked successes.

7. The majority of centrifugal pumps still are direct-driven by motors but there is a growing trend to V-belt drives.

Piping for circulating water wears through first where the suction line to the pumps changes from vertical to horizontal. At curves centrifugal force throws sand and pyrite to the outside. Patching will take care of this for a while. Later the elbows must be replaced. Horizontal pipes always wear through at the bottom. Examples are the large-diameter suction lines from settling tanks to the pumps.

Such lines often are patched by welding half circles of sheet steel to the bottom halves. Eventually even vertical circulating pipes must be replaced as well as valves and heavy fittings.

Slurry lines wear much faster. Examination of 6-in. discarded cast-iron pipe ½ in. thick indicated that it will cut through and cracks will appear along the bottom in two years. The amazing thing about this wear is that it is confined to a narrow strip about 1¼ in. wide along the lowest point. The eroded grooves are very narrow and very deep, say 5/32 by ¼ to ½ in. The grooves are irregular and not continuous because of the impurties in cast iron that resist wear. The pattern of wear suggests that slurry lines may be turned eight or even twelve times for a possible life of 16 to 24 years.

Steel piping cuts out in much the same way. There has not been an opportunity offered to study the pattern of wear. Several 4- and 6-in. lines have been replaced after approximately two years.

Boosting Replacement Life

Where new steel slurry lines have replaced failed lines they usually have been larger and sometimes thicker. In one instance provision was made for turning; in another, for welding half-circle plates on the bottom. In a third instance different material is used for replacement.

In the first instance, the original line was 4-in. standard steel pipe. This was replaced by a 6-in. double-strength steel line. Because of changes in processing the coal, speed of water flow in the new line will be about half. The new line will carry but 10 or 11 percent of solids, against 18 percent in the old line. These changes are expected to give a long lease of life to the new line.

In the second instance, 10-in. steel pipe replaced a 6-in. cast-iron line which lasted but two years. Cutting the water velocity to one-third that in the original line is expected to give much longer life to the new line. Most of the 10-in. line is blocked up on the surface for convenient repair. In three or four years it is planned to weld half circles along the bottom. It is laid to grade with provision for drainage.

In the third instance, a double 8-in. asbestos-cement slurry line has been installed with the expectation of long life.

An unusual slurry disposal set-up handles the 3/8 x 0 refuse from a launder-type washer. It comprises a vertical round receiving tank, a short connection to a rubber-lined pump and a vertical connection to a slightly drooping 8-in. discharge line. This line has enough drop to drain. Slurry is flushed from the washing unit into the receiving tank, where it collects until the pressure automatically starts the pump. The pump continues to run until the tank is empty, then stops. The bottom of the tank does not clog up but it is completely emptied at the end of the shift. This arrangement is similar to the scheme for pumping 4x0-in. gob at another washery.

The rubber lining in this pump lasts 45 to 90 days. The discharge line was originally 6-in. cast-iron pipe which had a life of two years without turning. The new 8-in. steel line is arranged for four turnings, 90 deg. at a time. Life is expected to be greatly increased. The present cost of a new rubber pump lining is $90.

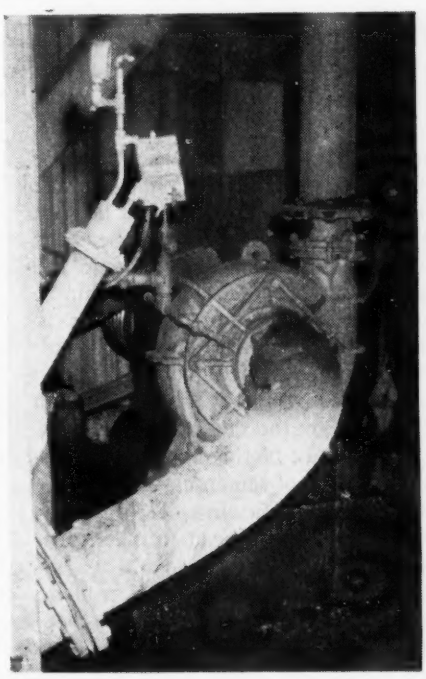
Some types of piping are urged because the joints remain tight in spite of sharp changes in direction as it is laid over uneven ground or up and down hills. One company operating several plants insists that the best engineering is to install all pipes carrying pumped solids either vertically or horizontally. Vertical pipes are subject to the least wear from erosion and horizontal pipes are less likely to clog than lines laid on an incline.

Screens

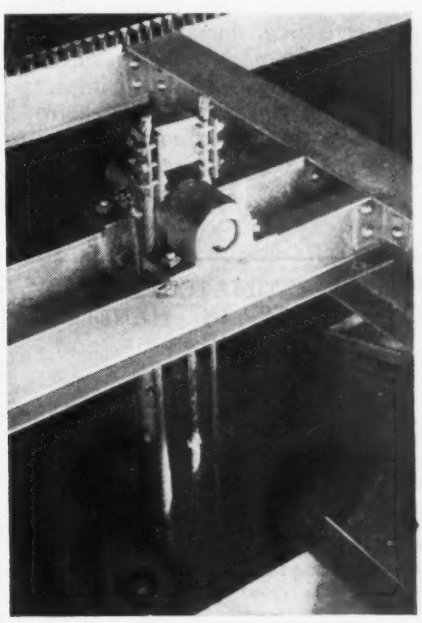
A great variety of screens are used about a coal-preparation plant to size raw coal, classify cleaned coal, dewater fines, dedust dry coal and salvage the last ounce of good fuel from slurry. The problems arising from these applications must be solved by the maintenance gang, since screens put on the finishing touches that please the customer. Preparation men have hatched numerous designs of screening equipment, which are operated at various angles, amplitudes and speeds; they use many metals and alloys for screening surfaces. Added to this is a profusion of punched plates, woven-wire screen cloths and parallel-bar screening patterns. Numerous combinations can be made up. The maintenance problems that arise are less difficult than might be expected.

Most shaking and vibrating screens are well made. The designs and materials assure long life in spite of the high speeds at which they operate. Lubrication usually is well provided for.

The screening and classifying of large-sized coal usually is over mild steel plates with round punched holes. These are satisfactory in decreasing sizes until the dimension of the coal becomes too small or until moisture blinds the plates. Sometimes water is added to wash the coal through. Perforated steel plates wear out and must be replaced. Stainless-steel plates with perforations up to 1 in. are being substituted for carbon steel for three reasons: sharp separation, long life and reduction of blinding. Because of long life they usually are made thinner.. For that reason they screen more accurately. According to several users



Driven by V-belts, this 6x6-in. pump handles 400 tons of 4x0-in. gob a day.



Clamped at the top, this wire rope passes around the lower bearing of this shaker-screen hanger. It is a safety device in case the hanger fails.

the life of stainless steel is four to eight times that of carbon steel.

Whether in plate or woven form, stainless steel is much cheaper than carbon steel for out-of-the-way places and multiple-deck screens where extra labor is required to make changes. The life of carbon-steel screen cloth is but a few weeks for some applications compared to around one year for stainless steel. The saving in labor may be up to 90 percent.

The bearings of shaking-screen hangers have pressure in but one direction and so are the one thing about screens difficult to lubricate. No one seems to have thought of a suitable roller bearing. Occasionally such screens are mounted on rollers or car wheels. They have good life with no danger of the screen dropping, as when supported by a hanger. Board hangers need no lubrication. They are trouble-free until they break—a rare occurence. A wire-rope loop is insurance.

Present-day methods of oil and pressure grease lubrication have practically eliminated the wear of eccentrics or connecting-rod brasses on modern screens.

Because the upper section of a two-part shaking screen is narrowed down, or for other reasons, there may be congestion of coal where it transfers to the lower section. This trouble was entirely cured in one plant by substituting stainless for carbon steel at the lower end of the upper section. A 3-ft. sheet did the trick.

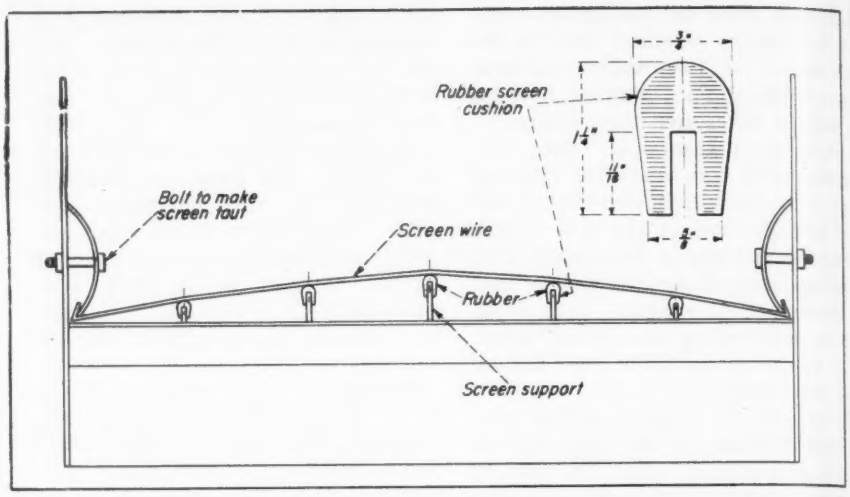
The classifying screen in the same plant has a $\frac{1}{16}$-in. stainless-steel plate with $\frac{3}{8}$-in. perforations for the small coal. The thin plate does a better job of screening, does not blind and lasts eight times as long as carbon steel. All wear is due to impact, abrasion and corrosion. With corrosion eliminated and erosion greatly reduced, life of these screen plates is multiplied. This is a stepped screen with a 3-in. blank space where the step is located. Previous plates were perforated at the double bends making up the steps. They failed in a much shorter time because of the stress set up by the bending.

Vibrating screens with speeds of 800 to 1,500 r.p.m. or more and driven by motors, belts or magnets are used for classifying and dedusting wet or dry coal, and for dewatering fine sizes of wet washed coal. Most of them are built substantially. That they perform satisfactorily is established by the fact that enormous numbers are sold to the industry and relatively few are to be found in the scrap pile.

TABLE I—ESTIMATED LIFE OF PUMP PARTS IN HANDLING SAND

Part	Material	Life
Case or body.....	Alloy	6 months
Suction-disk lining.	Alloy	6 weeks
Impeller.....	Alloy	3 months
Hub-disk lining....	Alloy	3 months
Shaft nut.....	Alloy	6 months
Suction-throat ring.	Alloy	6 weeks
Suction-sealing ring.	Alloy	6 weeks
Suction wearing ring	Alloy	6 months
Suction disk.....	Cast iron*	6 months

* When worn, a sleeve of braze-welding metal is made up, prolonging the life three times.



The crowning of the screen cloth in this illustration is greatly exaggerated to make it distinguishable. Actual crown is about ⅜ in. in 4 ft. The rubber cushion is made up in long strips reaching from end to end of the screen. Cross-section and dimensions are given for one type. The screen surface is held taut by the troughed hook sheets, which extended the length of the screen panel, and the hook bolts.

Tight Cloth Helps

Maintenance problems are said to be few in view of the speed at which they run and the fact that they are unbalanced machines. What ever the service, woven-wire cloth must be kept taut so the wires will not be bent unduly by the vibrations. Should the screen cloth become slack and whip to and fro, it does not take long to fatigue the wires at speeds around 1,000 r.p.m. When wires break a hole one can run one's hand through may result by the end of the shift.

Three major factors figure in lengthening the life of screen cloth:

1. Proper tensioning of the cloth. That means clamping it in place with clamps that stay put.

2. Proper crowning. Tension alone will not keep screen cloth from flapping up and down. It must have crown and the crown spans must be short. This is done by crowning the supports under the cloth. The crown for a 4-ft.-wide screen should be about $\frac{3}{8}$ in.

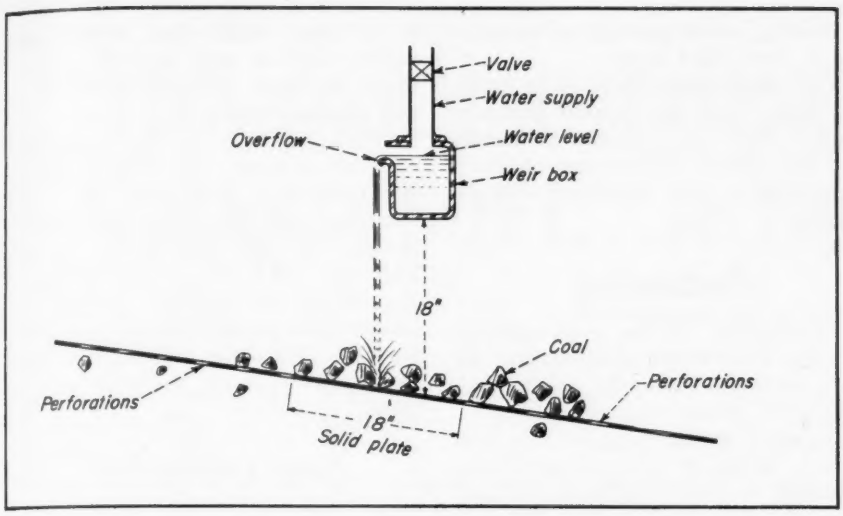
3. Cushioned supports for fine-mesh screens or sweating the screen cloth solidly to a perforated plate. In the latter case the plate must be well supported and solidly bolted down. The usual cushioning is rubber pads on the supports under the screen cloth. Another method is to stretch the screen cloth over a rubber-faced perforated plate with holes large enough to permit screening by the cloth. The plate must be solidly bolted down.

The important thing is to prevent the wires from bending enough to fatigue the metal. Since the maintenance of vibrating screen is largely replacing screen cloth, it is important to observe this principle so that initial breaking of wires is long deferred.

One plant employing a vibrator to screen the 28-mesh out of ¼x0-in. coal originally used a rubber-covered subpanel to support the woven screen. This cost $150. It finally was discarded and more water used. The present screen life is longer than with the rubber subpanel.

Another plant with 10- and 28-mesh stainless-steel woven-wire screens stretched over plates with ¾-in. perforations gets six months' service. In this case the cloth is fastened in a frame attached to the perforated plate.

Still another plant has increased the size of round rods in one type of screen from $\frac{5}{64}$ to $\frac{6}{64}$ in. to get longer life. That has the double advantage of more metal to be worn away before being scrapped and a larger cross-section to resist breakage. The one disadvantage is the reduction of water or air area, as the case may be. It may mean a reduction of capacity.



This is another method of "spraying" coal. The weir box is about 4 or 5 in. square. Water pours over a thin lip on one side in a thin flat sheet the full width of the screen. An 18-in. length of screen plate directly under the weir box is not perforated so that the water splashes back up to wash the under side of the lumps.

Out of the available information on vibrating-screen operation the following seems fairly well agreed on:

1. Certain types will drive the material uphill—an advantage in dewatering because the water cannot follow the underside of the wires or bars. In dewatering very fine coal, woven screens with long slots set at right angles to the flow of coal seem preferable to slots or wedge wires parallel with the coal flow.

2. Stainless steel and nickel-alloy metal have two inherent advantages over carbon steel. They are free from corrosion, so that screens made of them do not blind. They have practically no capillary attraction for water and therefore it quickly disengages.

3. A woven-wire screen should be crowned in the center.

4. Plate screens should be bolted down at intervals short enough to prevent slapping.

5. A successful screen for material under 20-mesh should be supported by a subpanel of steel plate (perforated). A woven-wire subpanel ordinarily is less satisfactory.

6. A stepped screen with the flow of coal against the steps will wear through at the exposed bends or corners.

7. The same trouble appears at the humps of woven slotted screen. These humps are caused by the bulge of the cross wires.

8. Woven carbon-steel screens of large mesh and made from heavy wire fail at wire crossings. They rust thin and then snap in two, due to the intense vibration.

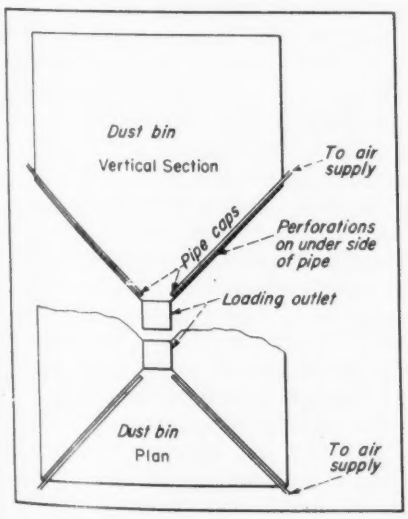
9. Vibrating screens mounted on rubber, with the underframe bolted solidly to the washery frame, run very smoothly.

10. Vibrating screens suspended from overhead by wire ropes or rods should be supported so that the weight is carried on spiral springs or rubber. Otherwise, the supporting ropes or rods will snap in two. Small weights often are clamped to the ropes to stop their vibration.

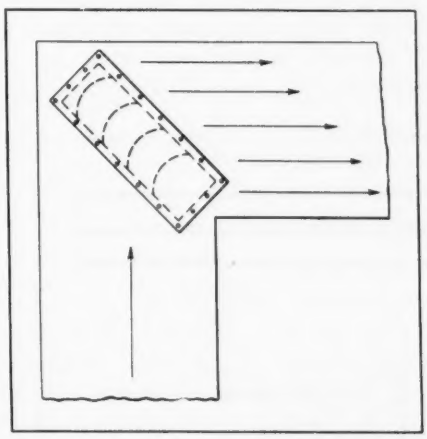
11. The heavy roller bearings supporting any vibrating screen must not be filled with heavy grease. This makes them difficult to start in cold weather and the bearings will run hot.

12. The driving motor for a vibrating screen should not be mounted on the screen frame. In any case it should be a ball-bearing squirrel-cage unit. Sleeve bearings and the brush rigging of d.c. motors will not stand up under such vibration. This applies to all types despite the fact that they are used.

13. A vibrating screen with heavy rotating drive should not be floor-mounted in a weaving or cross-motion vibrating building. Such motion usually is caused by heavy shaking screens. The gyratory effect of heavy rotating parts causes bearing trouble in such cases. The remedy is cable suspension so that the vibrating screen is not compelled to move with the building. If the building swings in one direction only, vibrating screens may be floor-mounted with the building motion perpendicular to the screen shaft.



Fine coal dust, even if dry, has a way of packing in storage bins. Compressed air will aerate this coal until it will run like water. Air pipes, each with a row of holes in the under side, are installed in the corners of the lower section of the bin. Loaded cars may need to stand over night for deaeration and retrimming.



This unit air deflector was fabricated by arc-welding from sheet steel and consists of curved vanes welded to top and bottom flat sheets. The bottom sheet is small enough to go through the rectangular hole in the duct. The top sheet is large enough to form a flange which is bolted to the top side of the duct. This deflector keeps most of the dust from striking the side of the duct, thus prolonging its life and increasing efficiency in dust collection.

Getting Good Dewatering

Many dewatering screens are high-speed (350-r.p.m.) short-stroke shaking units. These give very little trouble. The roller-bearing driving eccentrics are very successful. This same type of eccentric is used to drive the shaking screens in certain heat dryers, where they are equally successful. The screening surface in this type of screen usually is parallel bars set ½ mm. apart. Wider spacing sometimes is used. The bars may be wedge wire, wedge bar or round wire, usually of stainless steel but sometimes bronze or other alloys. These screening surfaces are made up into panels bolted into the frame of the machine. Screen life runs from one

to two years. Replacement normally is made when the space between the bars is worn wide and too much fine coal is lost to the slurry.

There are several reasons for the use of stainless steel, whether in wedge or round form. It does not rust and so the water drains freely. Spacing ordinarily is better maintained than with other materials. It lasts twice as long as bronze. In most plants examination is frequent and thorough and replacement is made before failure occurs. Close attention is important because wide slots mean a heavy loss of coal. The question of salvaging some of this fine coal, down to as small as ¼-mm., is being actively studied and a solution has gone into effect at a few mines. That solution calls for additional equipment and will add to the maintenance work.

Vibrating screens also are used for dewatering. One problem has arisen where the screen frame is supported on inclined flat-steel springs. In this case it was necessary for the screen base to be under water, which stands half way up to the supporting springs. Due to the excessive corrosion at the water line, these springs break off at that point. Perhaps such a failure might be expected.

The type of vibrating screen that has a forward, rising elliptical motion frequently is preferred over the circular motion when used for dewatering fine coal. Such screens are used in the process of salvaging coal smaller than ½ mm. One of the problems has been getting screen panels strong enough to carry the heavy load and stand the high speed. In one recent installation the screen is 4x16 ft. and the screen cloth is stainless steel woven with long ¼-mm. slot openings. While it is doing a very good job of dewatering it does blind some.

The preceding solutions to some operating problems support the contention that responsibility is mutual and cooperation advantageous to both maintenance and operating departments.

Dedusting

"Dedusting" is the word used to describe the process of separating the fines from the remainder of the coal, household stoker coal in particular. This word applies whether the coal is wet, damp or dry. It introduces problems for handling minus 10- and 48-mesh coals quite unlike those in handling coarse coals.

About the only way to dedust damp or wet coal thoroughly is to flush the fines through the screen with plenty of water. Coarse coal is dedusted with multiple sprays of water under pressure, which washes off the dust as the coal turns over on the classifying screen. One plant has devised a substitute for sprays to clean the dust from coarse coal. It consists of a long steel box hung above the passing coal. Water is piped to this box and a lip the full length forms a weir over which the water pours in a thin sheet, washing off the dust. A plain flat steel sheet is set in the screen directly under the water box. Water striking this sheet splashes up, cleaning the underside of the lumps as they pass. This scheme works very well.

Coal with some dampness may be dedusted on vibrating screens but blinding may interfere with doing a first-class job. Practically all types of vibrating screens are used for dedusting dry coal. For dedusting at 10-mesh, mild steel woven-wire screen cloth is used as well as the more expensive bronze, nickel alloy and stainless steel.

Dedusting fans and ducts carrying 48-mesh air-borne coal requires some maintenance. The cases of fans handling coal dust have been worn through by dust striking the metal. This wear can be stopped by the hand application of asphalt, forming a cushion that protects the metal of the fan case. Air ducts carrying fine coal in suspension wear badly at square turns.

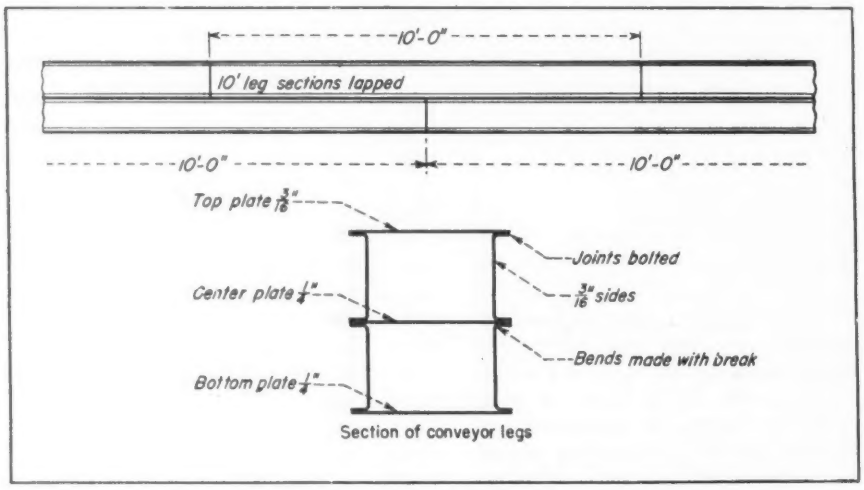
Vanes Lengthen Life

One plant not only extended the life of the air duct but increased the efficiency of the air system by use of vanes. The duct is square. A rectangular hole was cut in one side of the elbow large enough to admit a set of curved deflecting vanes. The vanes were built into a unit by welding them to two end plates. One end plate, together with the vanes, is small enough to pass through the opening in the elbow. The other end plate is large enough to bolt on the outside of the duct and carries the deflecting unit.

A special type of conveyor-elevator is used in some plants for handling fine dust in a tight inclosure. As normally built, the loaded and empty legs are set back to back, except for a short distance at receiving and discharging ends with a thin plate between. Also, the two legs are twins made up in 10-ft. sections. One plant has improved this construction by replacing the original $\frac{3}{16}$-in. center and bottom plates with ¼-in. plates for longer wear. Another change was overlapping the leg sections like laying brick. This made a much stiffer structure, from which any plate may be removed for repair without the structure falling down.

Bag-type collectors require attention. One plant has a collector made up of four groups of 40 bags each set on top of the washery building. The low-temperature seasons of the year produce a dewpoint condition resulting in moisture collecting and running down the bags to the lower connection, keeping it wet and causing rot. The bags are flame- and mildew-proofed but are not rot-resistant. In a period of four years 84 bags have been replaced. The annual rate can hardly be predicted until there has been a 100-percent replacement.

Dry dust that packs and refuses to flow from storage bins may be loosened by compressed air until it will run like water.



Horizontal section of mass-flow conveyor as redesigned. The 10-ft. sections now overlap for added structural stiffness and to facilitate replacement of any side or plate without collapse. Center and bottom plates were increased from 3/16 to ¼ in. to prolong the life of these parts, which must carry the load.

THE GERMAN ECONOMIC PEACE HARD, SOFT... or WORKABLE?

IT is not surprising that difficulties are being encountered in spelling out the detailed terms of the German economic settlement.

The problem is exceedingly complex. The German economy is more or less inextricably bound up with the economy of continental Europe. Before the war that area—excluding the United Kingdom, Ireland and Russia—accounted for approximately one-fourth of the world's production, and for more than thirty-five per cent of world import and export trade. Germany's production constituted almost one-third of the output of continental Europe. It is obvious that the decisions we make now concerning the future German economy will exert profound influence not only upon the economy of Europe but also upon that of the world. It is clearly not practicable to plan for an expanding world economy unless provision is made for Europe generally to share in the development.

Despite the magnitude and complexity of the problems involved, it is crucial that we and our Allies come to swift and decisive agreement. Such agreement is important both to world economic reconstruction, and as a demonstration that those who won the war can reach accord on the terms of world economic rehabilitation.

We shall accomplish little if we continue to debate in terms of *adjectives*. Yet most of the public discussion to date has centered around whether or not the economic settlement with Germany should be *hard* or *soft*. To make progress we must focus instead upon *objectives*. A good program is one that will promote our objectives—a bad program is one that will not.

What Are We Trying To Accomplish?

Upon the economic objectives of the German peace settlement there is little fundamental debate. This is demonstrated by reference to a number of documents of recent release—the United States Directive to General Eisenhower of April 1945, the Report of the Tripartite Conference at Berlin of July, the Report of the American Advisors to the Office of Military Government of September. The latter document stresses fundamental difficulties in developing a practical program for carrying out the objectives of the other two, but it does not question their formulation of aims.

What are the objectives that we are seeking to forward:

1. The disarmament of Germany.

2. The elimination of German industries devoted primarily to armament production.

3. The assessment of reparations to compensate those nations which have suffered losses from German aggression through direct war destruction and through the German policy of confiscating industrial equipment to her own use.

How Far Are We Agreed on Procedure?

There is also a wide measure of agreement upon detailed procedure for carrying out these objectives. No one, of course, questions the policy of confiscating German arms. Equally, there is agreement that German industry devoted directly to the production of war equipment should be confiscated or destroyed, and that control measures should be instituted and sustained to prevent her from reconstituting such industries in the future. Since it is not practicable to prevent aircraft production and shipbuilding from being diverted to military use, these industries are included in the armament category. And similar reasoning generally extends the list of prohibited industries to ball bearings and abrasives.

There is an additional category of German production which all of the Allied powers agree should be uprooted and permanently barred. It embraces all economic activity which prewar Germany cultivated on an uneconomic basis through subsidy and other protection for the prime purpose of developing a self-sustaining economy to support aggressive war.

The major elements in this category are not difficult to define. A great German industry for the synthetic production of gasoline and other oil products from coal never operated upon an economic basis. The cost of such fuel products to prewar Germany averaged almost four times what it would have cost her to buy petroleum products in the world market. It is doubtful whether these plants could be operated postwar at a cost much below three times the world market price for competing petroleum products.

A similar situation applies to German synthetic rubber production. In an attempt to free herself at least partially from dependence upon supply lines, she produced synthetic rubber at a cost at least double the world market purchase price. Similarly, she protected or otherwise subsidized a considerable agricultural production, particularly in grains, for which her lands were so ill suited that Germans had to pay for German-grown wheat from three to four times the world market price.

These are merely outstanding examples. The maintenance of such activities in Germany constituted a drain upon the German economy rather than an advantage other than that of preserving a self-sufficiency necessary for war. Hence their elimination is clearly indicated, and generally subscribed to, though the job of defining a complete list is far from easy.

What Is The Area of Dispute?

Unfortunately, this total catalogue of agreed-upon measures is not sufficient to provide either adequate security against a resurgence of German militarism or satisfactory restitution to her European neighbors for Germany's ruthless destruction of their industrial plant and equipment. To serve these two ends it is necessary to cut down the margin of German dominance in heavy industry—in steel, in electric power, in machine tools, and other industrial equipment. Unless such steps are taken, Germany will emerge from the war with sufficient industrial power to provide a continuing and perhaps uncontrollable military threat; and we should be perpetuating a dominance that was developed, as a matter of German strategy, far beyond the requirements of her civilian domestic markets or the export potentials of normal trade.

German steel capacity was built to a wartime peak of twenty-four million tons a year. Before the war she had accumulated a store of machine tools greater than that of the United States, and her present stock of some four or five million tons of such tools is second only to ours. There is little debate over the necessity and justice of cutting down the margin of German dominance in heavy industry, particularly since it was built to its current levels through aggressive economic warfare to serve as an instrument of actual warfare. It is recognized, too, that in this sector of the German economy will be found the most useful reparations in kind for the countries damaged by German aggression.

The question is how much heavy industry and electric power equipment should be taken from Germany and transferred to others. The Russians, having experienced colossal war damage, are demanding very severe assessments. They talk of reducing postwar German steel capacity to three million tons annually.

The United States inclines to assessments in this field of less extreme dimension—we have suggested leaving in Germany an annual steel capacity of from seven to ten million tons. We naturally are concerned lest action be taken that will cause a complete breakdown of the German economy. If this should happen while we maintain occupational forces there, we should feel responsible for seeing that the Germans within our jurisdiction are provided with at least the means for subsistence. Furthermore, both we and the British know that in the long run our peoples will not support control measures over Germany which go beyond our concepts of reasonable fairness consistent with security requirements.

It is no part of our intention, as has been suggested by some, to provide for a German economy that will serve as a buffer against Russian expansion. We know, however, that our weakest course would be to commit ourselves now to continuing control measures which our people would later repudiate as falling outside democratic concepts of justice. On this issue we cannot, and should not, compromise.

How Can We Resolve Our Differences?

The best chance for resolving the differences which have appeared between the Russian position on the one hand and the American and the British position on the other lies in making a sharper distinction than has appeared in current discussion between long-term and short-term control decisions. All of us are agreed upon the policy of wiping out German military production and that part of German economic activity which has been run at economic loss to provide for a national self-sufficiency useful only for war purposes. But we are unwilling to enter into long-term commitments for holding down those parts of the German economy that do not constitute a war threat. That would unduly penalize future generations of Germans and drag down the whole economy of continental Europe.

It should be possible to reach agreement that measures for cutting down German heavy industries and power-generating facilities are immediate measures, and that no attempt will be made to sustain such controls over an extended period. If part of the German establishment in these fields is transferred to countries whose manufacturing resources have been damaged by German aggression, it can serve the purpose of effecting a reasonable balance without destroying utterly incentives for a new generation of Germans to improve by peaceful methods their status in a peacetime world.

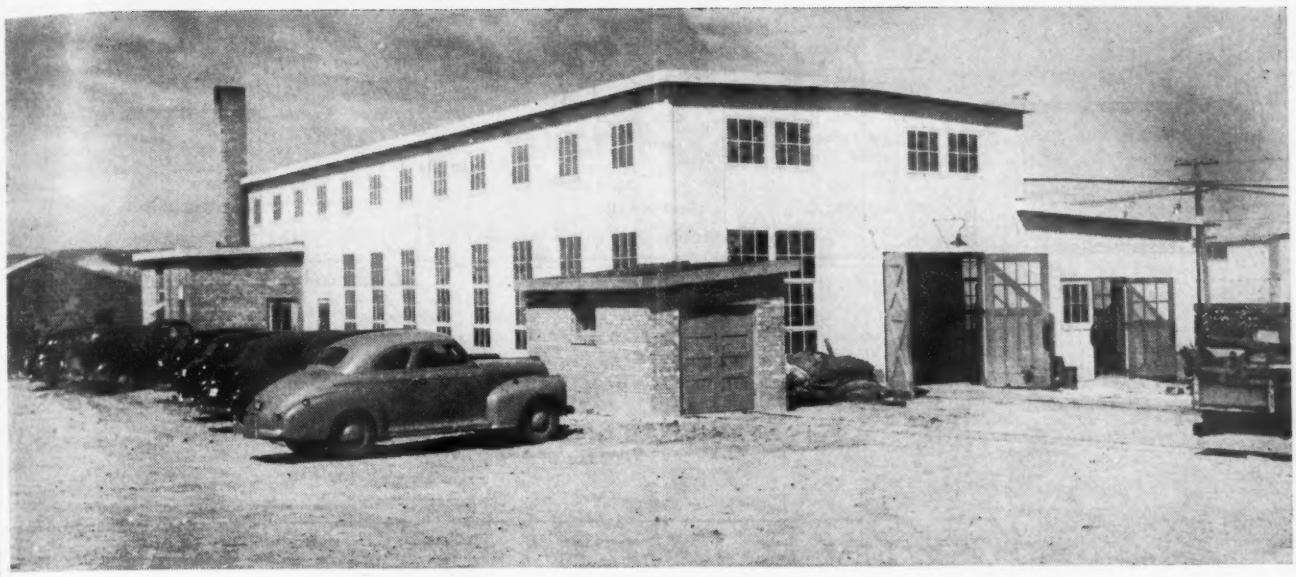
Such a program is consistent with the concept of building a healthy and balanced European economy in which general economic interdependence provides one of the essential safeguards against a resurgence of German militarism. We must still face the problem of agreeing upon how far the non-armament segments of German industry can be cut back at the present juncture without leading to disastrous breakdown with its resultant chaos. Such definition, though formidably difficult, should not be beyond the capacities of the nations whose combined might brought victory, and who have the strongest of incentives for devising a lasting peace.

The key to agreement lies in each of us doing his best to understand the position of the other. Russia must recognize that we cannot get our people to subscribe to the permanent repression of a European economy which would deny to millions of people any hope of normal economic betterment. We should try to understand Russia's conviction that she is entitled immediately to reimburse herself for her war losses by drawing upon the German industrial establishment that still exists. It will help to resolve our differences if we separate in our thinking steps that require permanent controls from those which are merely temporary expedients.

Neither of us will be forwarding our ultimate and common objectives if we impose controls that blight the development of so large and important a segment of the world as continental Europe. In such a blight lies the germ of a Third World War.

President, McGraw-Hill Publishing Co., Inc.

THIS IS THE 41ST OF A SERIES



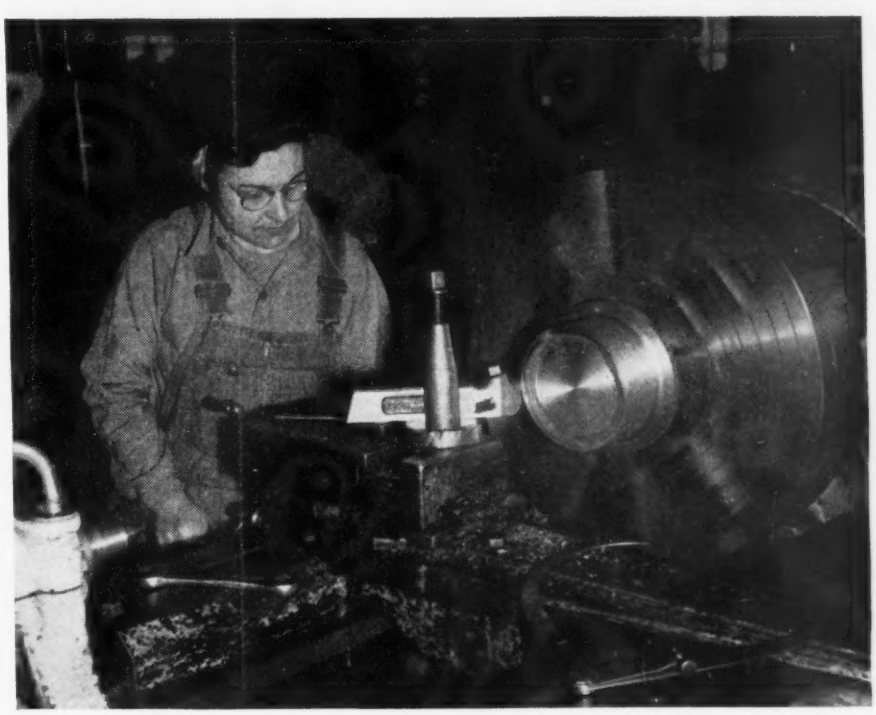
This new shop at Stansbury has many late features and the latest in equipment.

MODERN SHOPS

Meet Maintenance Need at Union Pacific

Roomy, Fireproof Installations are Well Lighted, Ventilated and Heated—Repairs by Trained Mechanics Using Costly Machine Tools Match Factory Work — Outdoor Oven at Stansbury Anneals Drawheads

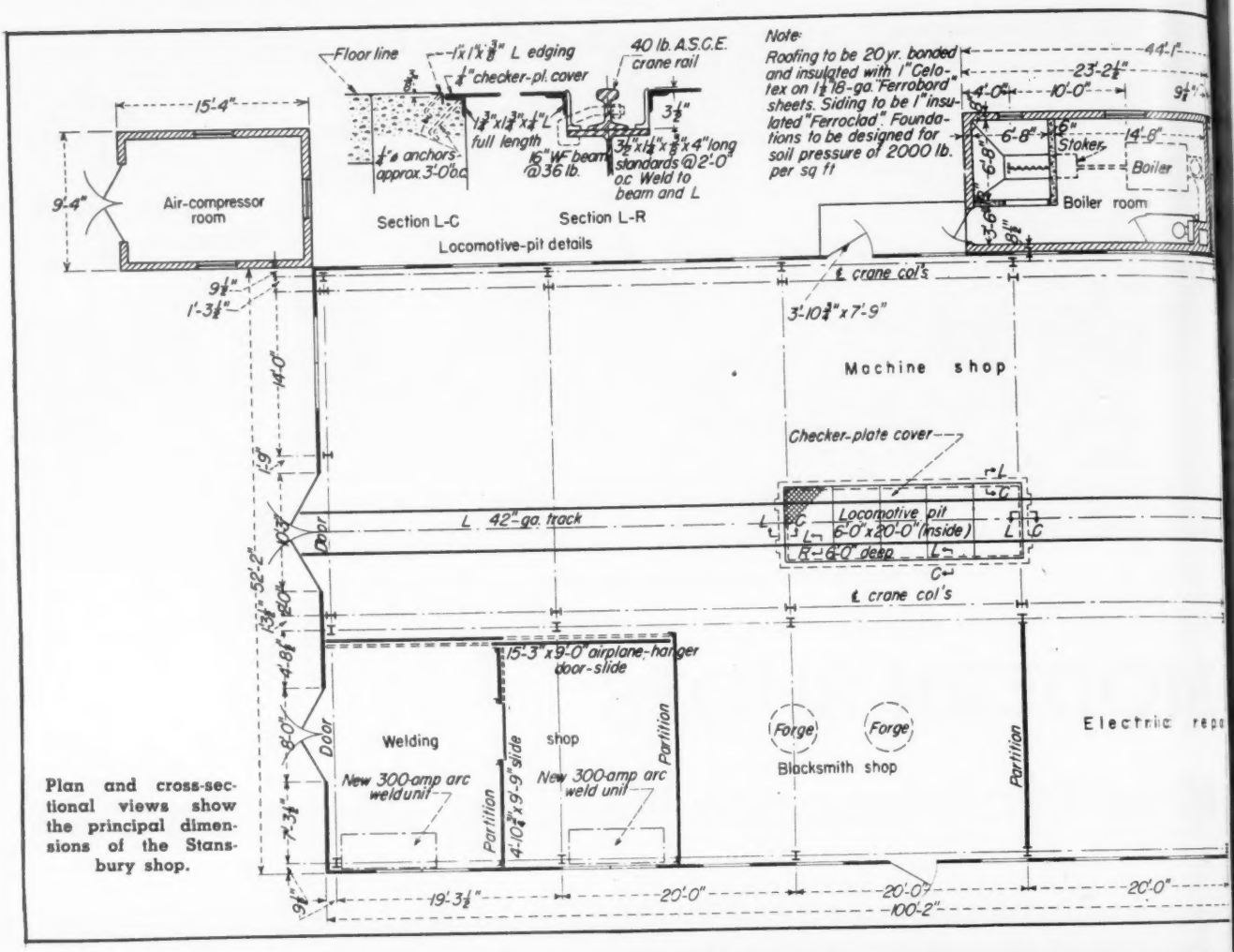
EACH new repair shop built by the Union Pacific Coal Co., Rock Springs, Wyo., is, in one way or another, better than the last. New shops already constructed at Reliance, Superior and Stansbury—and one under construction at Hanna—evidence Union Pacific's regard for the principle that good shop facilities and well-trained mechanics are, in a large measure, the answers to satisfactory maintenance of modern mining equipment. Good repairing, done in time, may not eliminate breakdowns in mechanical equipment but it certainly lowers their frequency. One aim has been back of all the changes that have gone to make each new shop a better one—anything to effect better and speedier repairs.



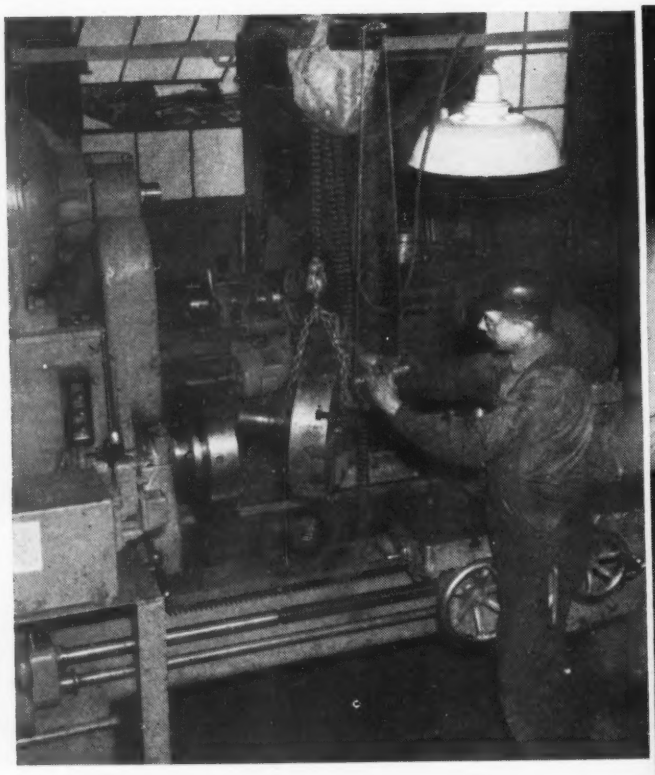
Viola Eccli, of the apprentice course (Rock Springs), turns down a wheel to be used as transformer mounting.

Shops Vary by Mines

Despite the fact that all the shops were constructed to the same general building plan, only the outward appearance has any real degree of similarity among these modern structures. Inside, each either looks or is equipped

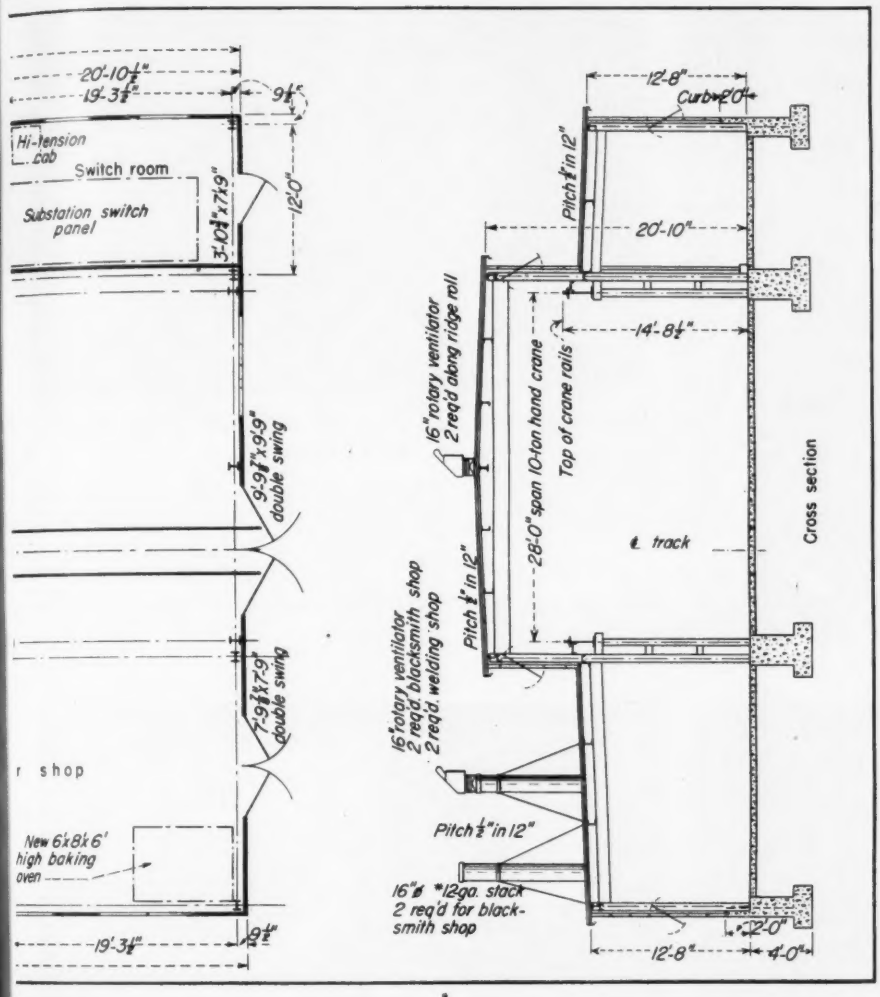


Plan and cross-sectional views show the principal dimensions of the Stansbury shop.



Robert Overy, machinist (Reliance), demonstrates the handling of a lathe chuck by means of an electrically operated hoist. Note the adjustable lighting fixture above the lathe.

A special exhaust hood takes away all fumes and gases given off during the welding operation.



a little different. Each building has a story-and-a-half crane-bay section 31x 100 ft. long with a one-story lean-to section 21 ft. wide running the full length of the structure. On the opposite side of the crane bay, one or two one-story brick rooms extend out from some of the shops. One houses the boiler room and in a separate room the shop's power service equipment. The other houses a portable air compressor.

Design Is Modern

Among many of the features incorporated in the shop structure are: (1) liberal use of windows to permit taking maximum advantage of daylight for illumination; (2) large roof ventilators; (3) roomy entrances on all four sides of the building; (4) unit heaters which also can be used to improve shop ventilation during the summer months; (5) stack exhausters for expelling the smoke and fumes from the blacksmith forges and the welding rooms and (6) Ferro-clad Celotex panels on a structural steel frame for the main building.

Prior to the opening of the new Stansbury mine (which started production in January, 1944) the shop serving Mines No. 4, 8 and 11 at Rock Springs was considered to be the headquarters for all the shops. With these mines nearing exhaustion the new shop at Stansbury will become the new headquarters. Perhaps because it was to assume such an important role, and partly because experience in floor space assignments in the two other shops previousy built were incorporated in its layout, Stansbury is perhaps the outstanding shop of the group.

The main bay at Stansbury houses most of the large individually motored lathes, milling machine, shaper, planer, radial drill, grinding machines, pipe-threading machine, metal band saw, post drills and a bolt machine. Overhead a three-way manually operated 10-ton Shaw-Box crane and hoist operates on a track running the full length of the building. The lean-to section contains two welding rooms, a blacksmith's shop and an electrical shop.

A three-year apprentice course for training machinists, electricians and welders, which has been operating 16 years, has been extremely beneficial since the manpower shortage became critical. The women shown in the accompanying illustrations are completing the final six months of the course. Both men and women taking the course are advanced in rating and pay every six months. Besides operating lathes and kindred shop machines women do assembly work in the shop. About the mines other women, with no special training, are used in tipples as pickers and to operate control boards.

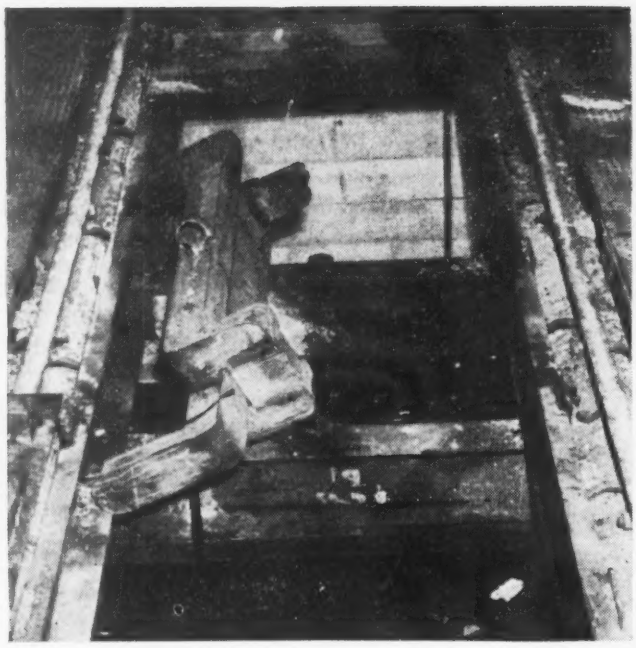
After completing the course the graduates become full-fledged craftsmen or craftswomen and are given permanent assignments at one of the shops. Where possible, all work is brought out to the surface shops for repairing. Occasionally, mechanics with the proper training are dispatched to make repairs on location.

Equipment Meets Needs

Among the many standard-brand machine tools at Stansbury is a 42-in. American lathe with a 27-ft. bed. Because of its size, and also because it is equipped with 30-hp. drive geared to give face-plate speeds of 1.8 to 157 r.p.m., this lathe has many special jobs brought to it. The very latest in machine-tool design is found in an American radial drill which has a 4-ft. 9-in. column. All machines are installed on separate concrete foundations and are arranged so that the operator has good natural lighting and ample working room. The lathes, in particular, are placed so they are between the operators and the nearest windows. This aids the operators when they must caliper their work. For night work and dull winter days 1,000-watt Hi-Bay lighting fixtures on 15-ft. centers furnish the general illumination while either a fluorescent or incandescent light mounted on an adjustable bracket at each machine provides additional illumination directly on the work.

Not only are the machines kept in good condition but the expensive attachments are carefully put away. How the attachments are stored in a metal cabinet at Stansbury—away from dust, grit and grease—is shown in another illustration with this article.

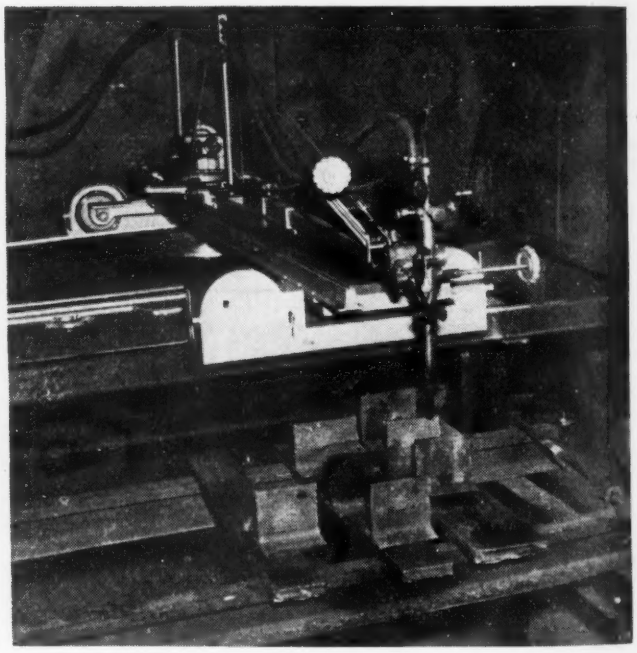
In keeping with the roles which electric and oxyacetylene welding and cutting play around every mining property, Union Pacific has provided at each shop two 15x20-ft. completely partitioned rooms for this purpose. In most instances, each room is equipped with a portable 300-amp. welding set. Some of the shops have 250-amp. portable and 500-amp. stationary a.c. sets. The restriction to the use of a straight-polarity rod is one limitation of the a.c. set, say the welders.



Kenneth Matthews, chief electrician, Stansbury; Haydn Williams, Rock Springs.

Motor pit also is equipped with apparatus for straightening pit cars.

Expensive machine tool attachments are kept in a metal cabinet, away from dust and grit.



Flame-cutting machine used to carve out intricate shapes from steel plates up to 6 in. in thickness.

Consideration for the welder's comfort, as well as his safety, is evidenced by the fact that each welder has an exhaust hood connected to the Ruemelin fume ejector system for carrying away the fumes and gases. This safety feature is of secondary importance when compared to Union Pacific's first must for everybody—safety goggles.

Intricate shapes are cut from steel plates up to 6 in. in thickness on the Oxweld Railroad Service CM-2 shape cutting machine. A template is made by fastening ¼x¼-in. bar aluminum to a ⅛-in. steel sheet. The acetylene gas used for flame cutting and for all torch work comes from a carbide-to-water generator located in a flameproof building remote from the shop.

Lamps Heat Oven

The electrical room is 20x40 ft. and opens into the main bay of the shop. A 6x8x6-ft. high baking oven is located in one corner. At most of the shops the baking oven is heated by strip heaters. However, the Stansbury oven is equipped with a battery of 48 250-watt 115-volt General Electric reflector heat lamps. The infra-red heat from this 12,000-watt bank of lamps bakes armatures from the core out rather than from the surface in, and more quickly. Baking time has been cut 75 percent.

A switchboard for testing both a.c. and d.c. apparatus at Stansbury has standard switchgear-size ammeters and voltmeters with air circuit breakers for protection.

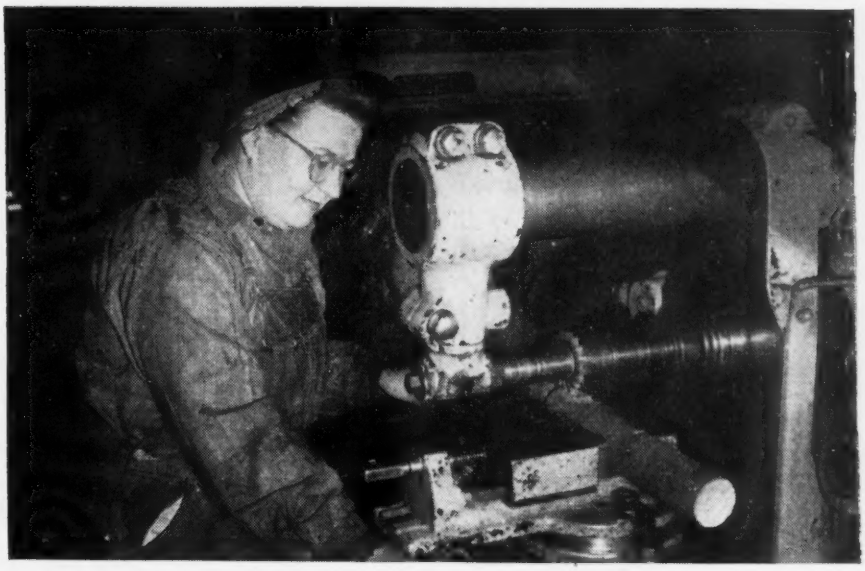
Opposite the 20x30-ft. blacksmith shop, and along the 42-in. gage track which runs the full length of the shop, is a 6x20x6-ft.-deep motor pit. This pit also is used for straightening damaged

W. K. Lewis, master mechanic, Stansbury.

Raymond Dupont, master mechanic, Reliance.

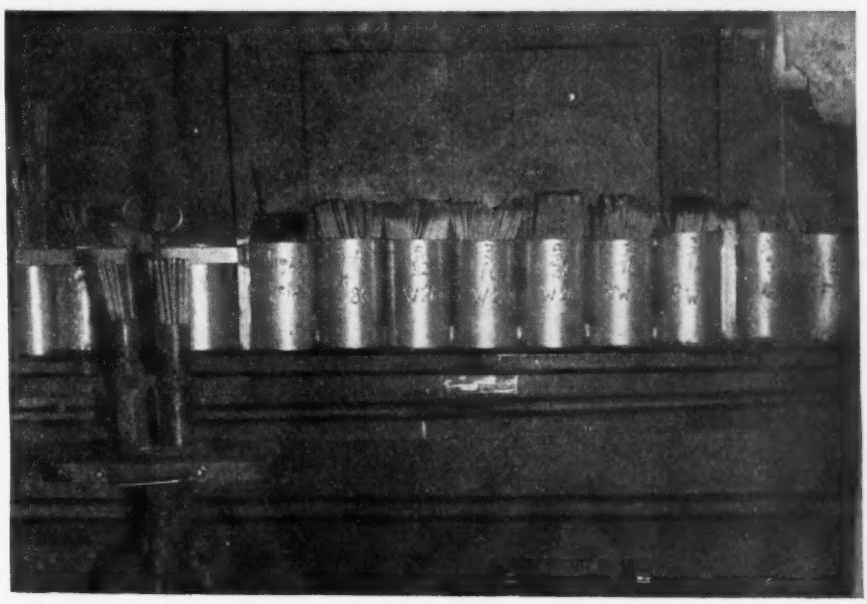
Claude Hiner, master mechanic, Superior.

David T. Faddis, general master mechanic, supervises the installation of new hoist at Stansbury.



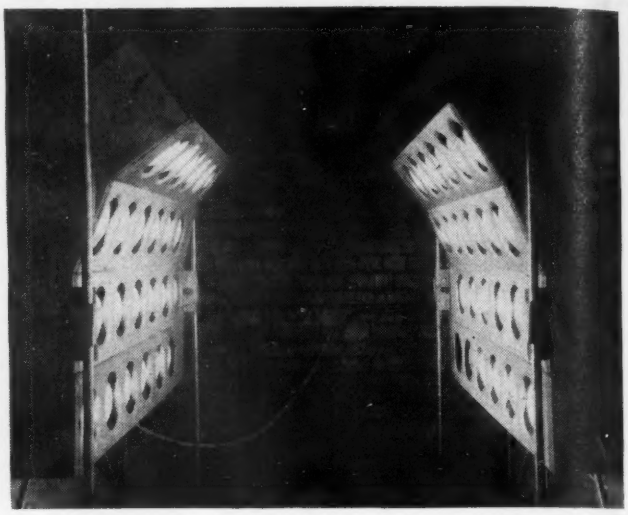
Anne Ojala, of the apprentice course (Rock Springs), milling out a key seat in a shaft.

Hans Hansen (Rock Springs) keeps ventilating tubing repaired.

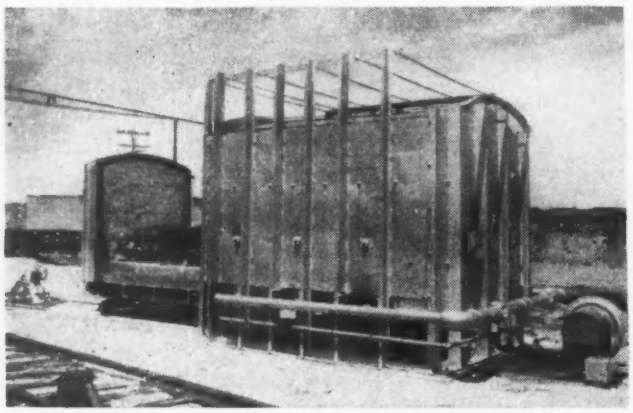


Welding rods are kept in separate containers labeled with the type and size.

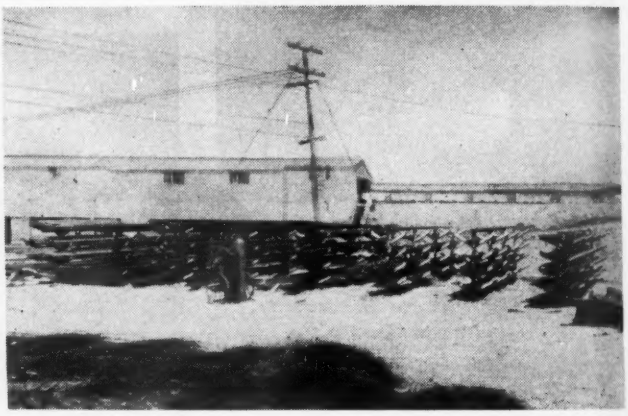
Acetylene generator is stationed in a fireproof building remote from the shop.



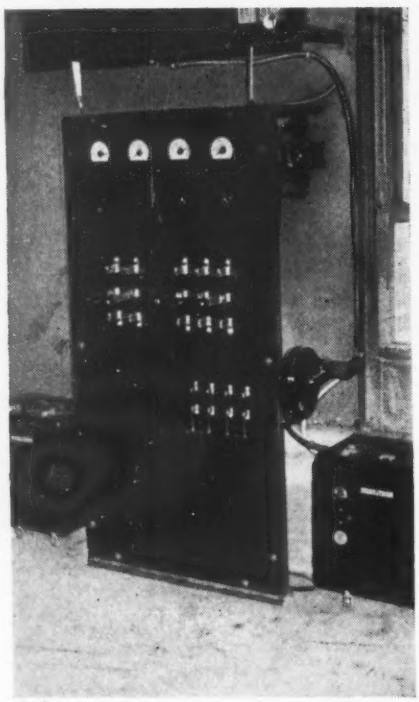
Heat lamps are used to bake armatures at Stansbury.



A group of drawheads, just annealed, have been withdrawn from the oil-fired annealing furnace at Stansbury.



Good material racks in the mine yard save time and help to cut down injuries to shop personnel.



Switchboard for testing a.c. and d.c. equipment is protected by air circuit breakers.

pit cars. Checkered plate covers close up the pit, both inside and outside of the track.

Recently a remedy was found for the breaking of a certain cast-steel-type drawhead used on the steel pit cars. The top section of the drawhead was removed with a torch and replaced by arc-welding a 1x6¼x26½-in. long bar steel section in its place. The manufacturer insisted that after this operation the drawhead should be annealed. Unable to find but a comparatively small annealing oven, and a portable unit at that, the company decided to build one. The oven now in operation at Stansbury, shown in an accompanying illustration, is completely lined with firebrick. Heat is derived from six oil-fired burners.

Breakage Eliminated

Eventually all drawheads of this type are to be trucked in from the various mines and worked over in this fashion. Before annealing a group of the drawheads the burners are lighted and then the car bearing the drawheads is rolled in. The temperature of the oven is raised to 1,450 deg. F. and kept at that point for 4 hours. An indicating meter located inside the shop shows the temperature as measured by thermocouples out at the oven. After the 4-hour heating period the burners are turned off and the oven is allowed to cool two days before the drawheads are removed. The change in material and the subsequent annealing have eliminated any further breaking of the drawheads.

Besides repairing, mending also is done at the shops. In one corner of the Rock Springs shop a man mends torn and damaged sections of ventilating tubing. Stopping the leaks in tubing and forcing all of the air to go all the way is important in ventilation work.

More than ordinary care is taken in the racking of stock items in the mine yard. An accompanying illustration shows a method making it easy to get a pipe or bar of steel of a particular size without disturbing a half dozen other items. This saves time and, even more important, it makes injuries to shop personnel less likely.

LARRY TRAIN
Solves Oak Hill Refuse-Disposal Problem

Four-Car Train Wins Over Other Systems in Long-Range Planning for Refuse Disposal—Equipped With Dynamic Braking, Train Operates on a 10-Percent Grade—New Rectifier Installation Supplies the Power

By **RALPH R. RICHART**
Assistant Editor, Coal Age

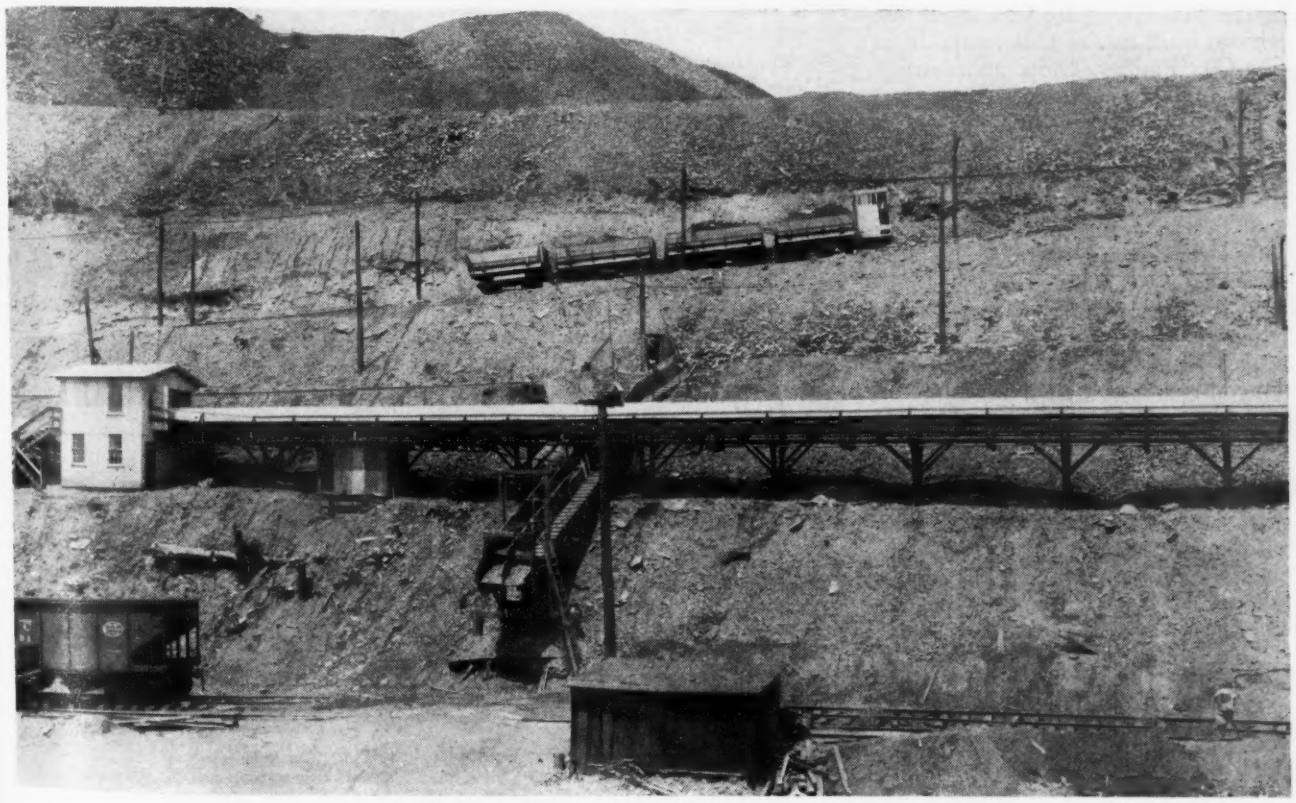
A FOUR-CAR larry train operating on grades up to 10 percent and powered by a 750-kw. 600-volt sealed-tube ignitron rectifier was the solution to the rock-disposal problem at the Oak Hill colliery, Philadelphia & Reading Coal & Iron Co., Minersville, Pa. After the average daily output of the Oak Hill breaker was increased in February from 2,500 to 3,500 tons (due to more coal from the strippings) three Euclid 12-ton trucks were pressed into service to supplement the work of the two old single-unit larry cars, which after years of use were almost ready for the scrap heap. Even more serious than the capacity handicap was the fact that the available dumping space at the height the old larries could attain (on a 3-percent incline) was about used up. The problem was to gain altitude for additional dumping space.

The problem was attacked from three angles: (1) a continuation of the 3-precent grade involving the purchase of new equipment; (2) a belt-conveyor system which called for some new equipment and the use of part of the old equipment; and (3) a complete new larry train installation with the attendant power equipment to enable it to negotiate long grades of 10 percent or less.

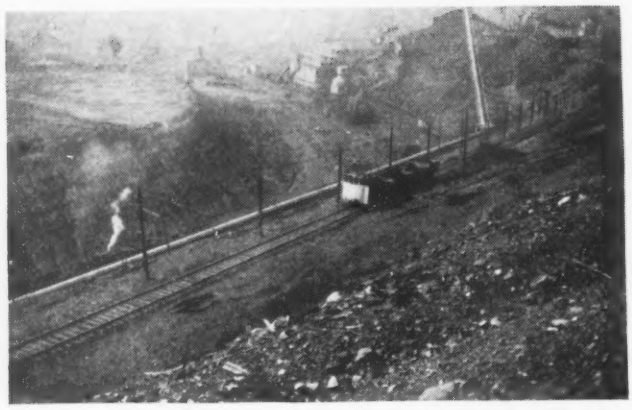
The first plan considered, that of continuing to dump on a longer 3-percent grade, meant buying two 35-yd. larry cars and one additional 300-kw. m.g. set. This would have stalled off the real solution to the problem for only 5½ years.

The second plan, that of a belt system, called for a rock crusher to break the rock before it could be transported by the belt. At the discharge end of the two-unit belt system a storage bin would have been necessary. Larry cars, one new 35-yd. unit and one old unit (which had to be completely overhauled), would have taken the refuse from this bin and dumped it. This arrangement was conditioned on the purchase of a 300-kw. 250-volt rectifier to augment existing m.g.-set capacity. This plan would have satisfied the rock-disposal needs for the colliery for only 13 years.

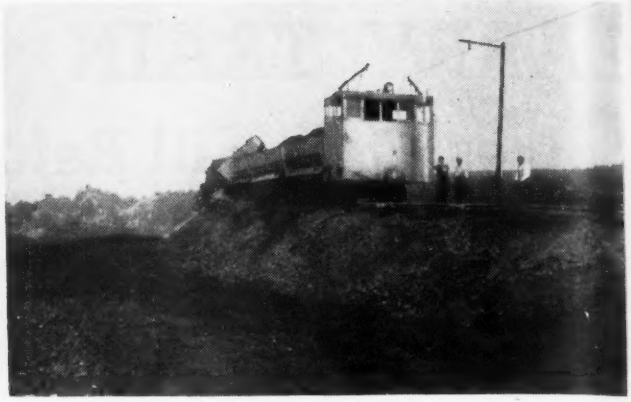
The third plan considered, which proved to be the logical choice from the standpoint of labor and equip-



The four-car larry train has no difficulty starting on the 10-percent grade.



Refuse hauled by larry train passes raw coal being carried by belt from the Beechwood strippings to the Oak Hill colliery.



The trailer car is being dumped from the control cab of the train by compressed air.

ment costs, involved the purchase of a four-car larry train capable of making 10 m.p.h. on a 10-percent grade. a new rectifier unit substation and building, and heavier track and trolley-line construction. Aside from being the most economical means of meeting the problem it was a solution for a 20-year period.

Present output of prepared coal at the breaker is about 55 percent of the raw-coal feed. The other 45 percent (less the 350 tons pumped away as silt) aggregates 2,500 to 2,700 tons and is the quantity of refuse that must be hauled and dumped on the bank each day.

Larry Has Four Units

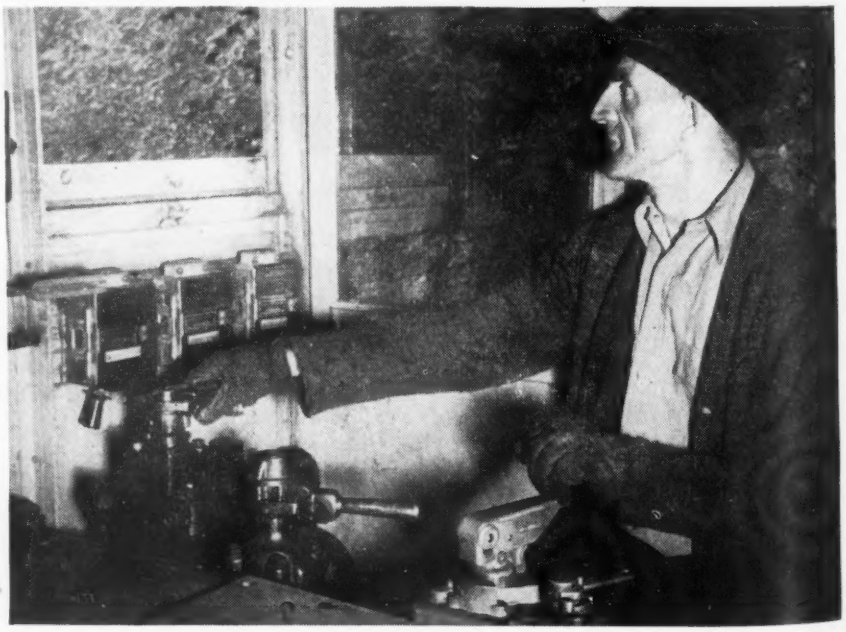
The new larry train now doing the job was built by the Differential Steel Car Co., Findlay, Ohio, and consists of a motorized-control cab car, two motorized trailer cars and a trailer car. All motorized cars are equipped with the conventional 8-wheel "Axless" trucks and the trailer car is equipped with two axles and four 33-in. wheels with journal-box mountings. The capacities quoted on the bodies (water-level full) are 16, 19, 19 and 15 yd. respectively, beginning with the motorized-control cab car. Some 90 tons of refuse is hauled each trip and the maximum weight of the train is 169 tons. The first three motorized cars have two-way side-dump bodies while the trailer car is arranged for two-way side and end dumping. All cars may be dumped individually or simultaneously by air from the controls in the cab car or, if preferred, the controls on each car may be actuated by hand.

The layout of the track is as follows: first 200 ft. at the loading station, level; next 100 ft., grade increased to 2 percent; next, a vertical curve in which the grade changes from 2 percent to 10 percent, while at the same time the track swings slightly to the right; then a straight-away stretch on the 10-percent grade measuring 1,330 ft.; next, a vertical curve at the end of the 10-percent stretch where the grade tapers off to a level length of 160 ft. where a back switch is located. A 200-ft. section beyond allows sufficient room for clearing the switch. On the back-switch section, the track curves right and quickly changes to an 8-percent grade, ultimately to extend 2,700 ft.

The track was laid with 100-lb. rail up to and through the back switch. From there on on the 8-percent grade 70-lb. rails are used. Each rail joint is bonded with two 4/0 bonds and the track is cross-bonded with a 4/0 bond every 200 ft. A 6/0 trolley is used all the way and two 750,000-cir.mil positive feeders are carried the full length of the 10-percent grade.

The d.c. traction motors, full magnetic control, dynamic braking and air-brake equipment were supplied by General Electric. Each motorized car is equipped with two 126-hp. 600-volt motors, one mounted on each side of the car and geared to drive four wheels —two fore and two aft. The train is controlled by the motorman from the cab car by means of a 14-point series-parallel master controller (600-volt control)—eight points series and six points parallel. Each of the first three cars is a separate and distinct electrical unit, having its own magnetic contactor-type control devices and resistor units.

Segregation of motor circuits lessens the possibility of widespread trouble in the event of difficulty with the dynamic-braking control circuits. At present, the empty train descends the 10-percent grade on the third dynamic braking point—eight points of dynamic braking are available. In regenerative braking, the braking effort



John Bentz, operator, halts the train at the loading chute.

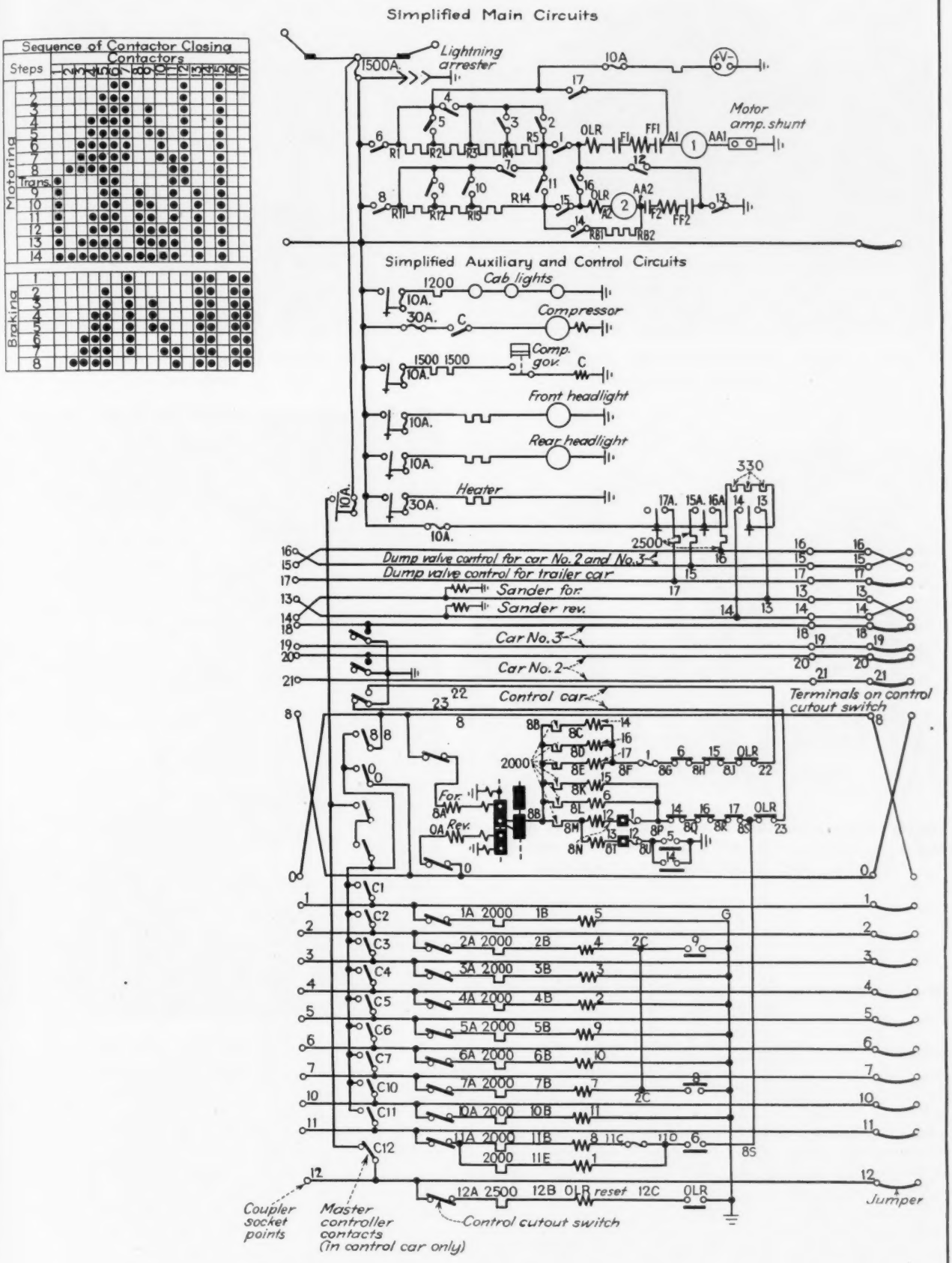
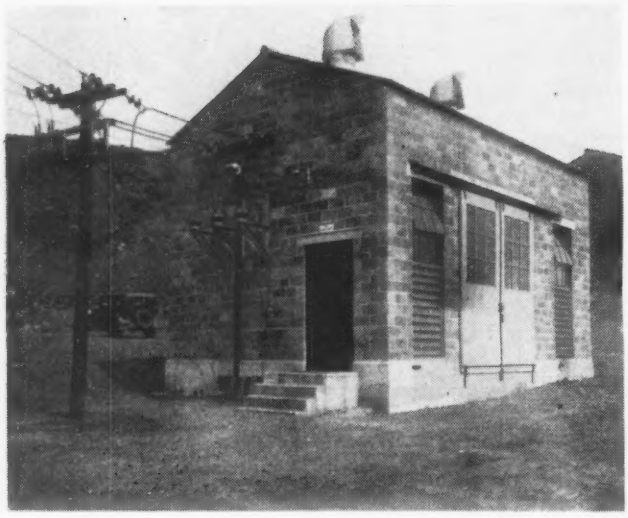
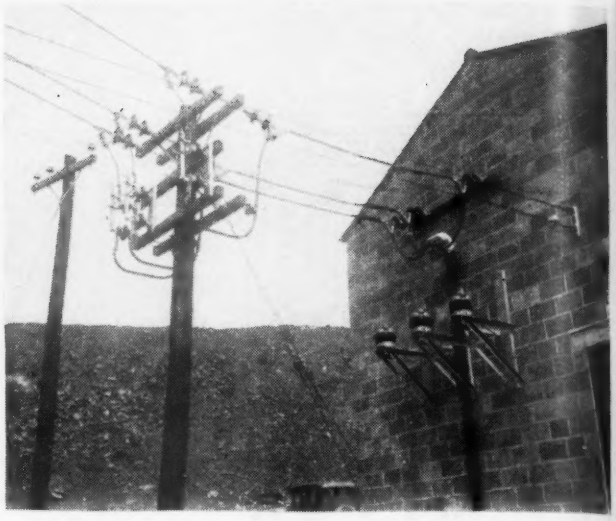


Fig. 1—Wiring diagram for the larry car shows the sequence of operation for both motoring and braking.

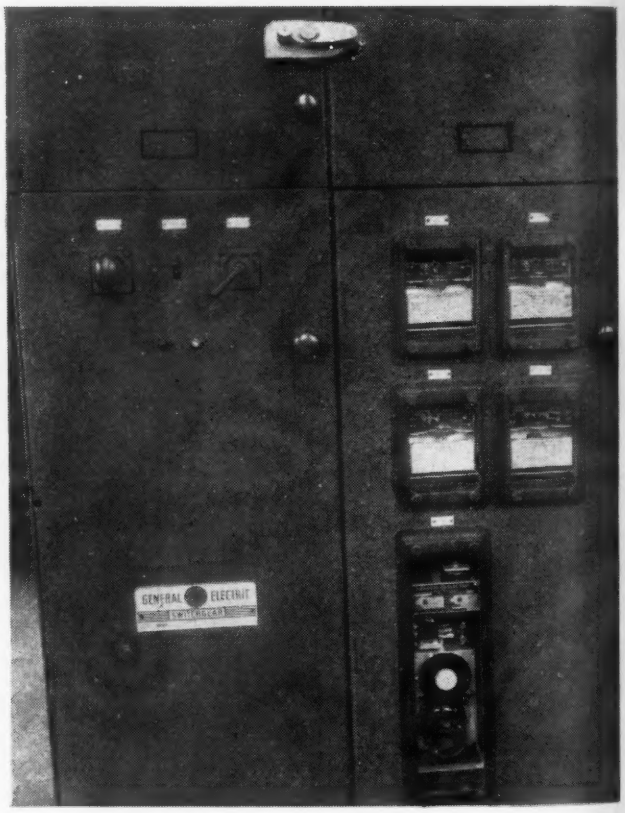


A modern fireproof building houses the completely automatic sealed ignitron unit substation.



The 2,300-volt circuit entering the substation involves much line hardware.

The 600-volt d.c. circuit leaving the substation received the same degree of attention as did the high-voltage circuit entering the station—even to lightning-arrester protection.

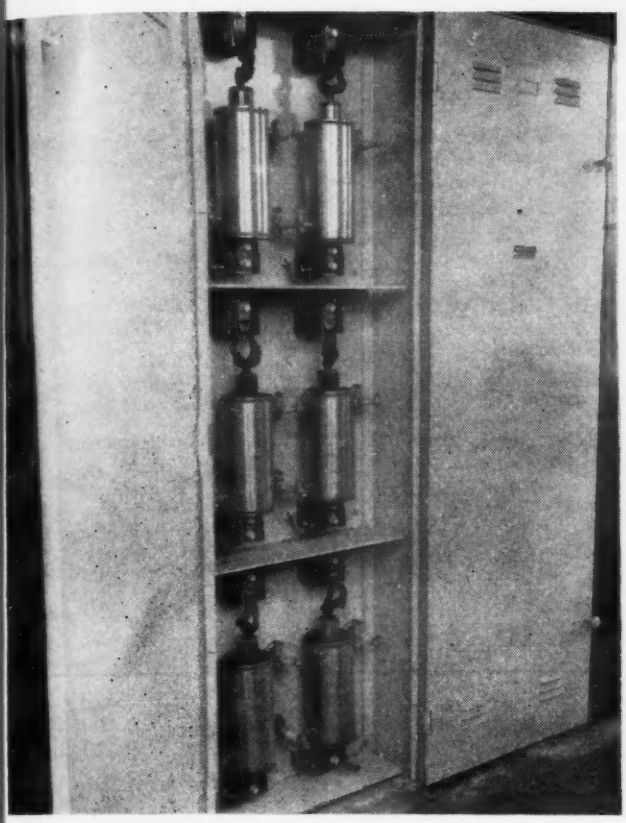


All of the instruments on the metal-clad a.c. switchgear are of the draw-out type

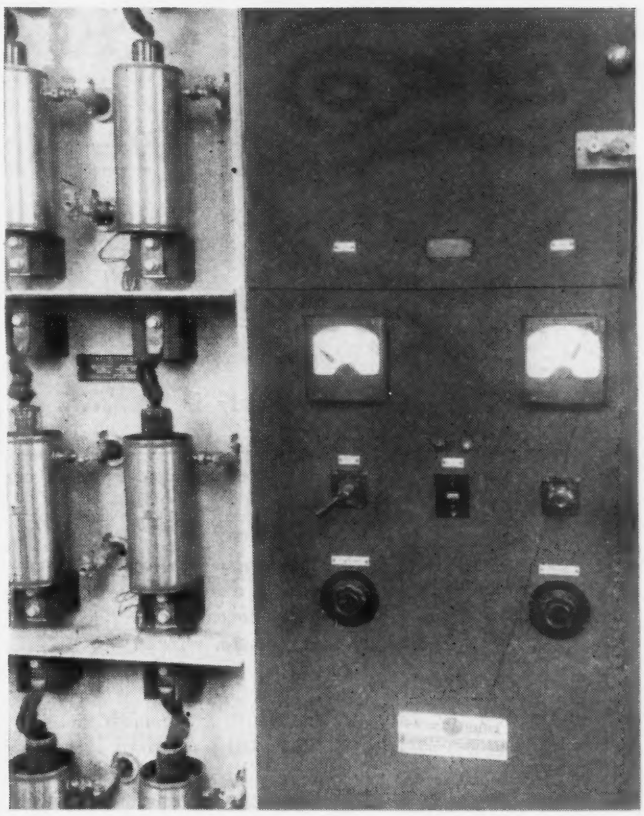
available for a train descending a grade depends on the use made of the energy generated by its traction motors (acting as generators) by other units consuming that energy elsewhere on the same electrical system. With dynamic braking, no other unit on the system needs to use this generated energy. It goes directly to resistor units (common to this motor circuit) and is dissipated as heat. Dynamic braking saves wear on both the brake shoes and the wheels.

The Oak Hill larry installation marks the first time in the anthracite region that a sealed-tube ignitron rectifier takes up the work of power conversion alongside the m.g. set and rotary converter. Its high peak-load rating and low light-load losses offer advantages in traction service. In this instance, a 600-volt rectifier installation was necessary because the larry train (originally built for another customer) was available already equipped with 600-volt traction motors. This stationary 12-tube 750-kw. 600-volt sealed-ignitron set is part of a General Electric unit substation and operates from a 3-phase 2,300-volt delta-connected 60-cycle circuit. The substation unit consists of the a.c switchgear and 220-volt auxiliary control, power transformer, rectifier and d.c. switchgear. All the switchgear units are metal-clad and they and the rectifier inclosure are throat-connected to the power transformer.

Mounted in the a.c. switchgear unit are the drawout-type Magne-Blast air circuit breaker and the auxiliary-control power transformer. The 850-kva. power transformer is Pyranol-filled and provided with four 2½-percent taps—two above and two below the normal (2,300) rated voltage. The taps are brought to a wedge-type tap-changing mechanism operated from a

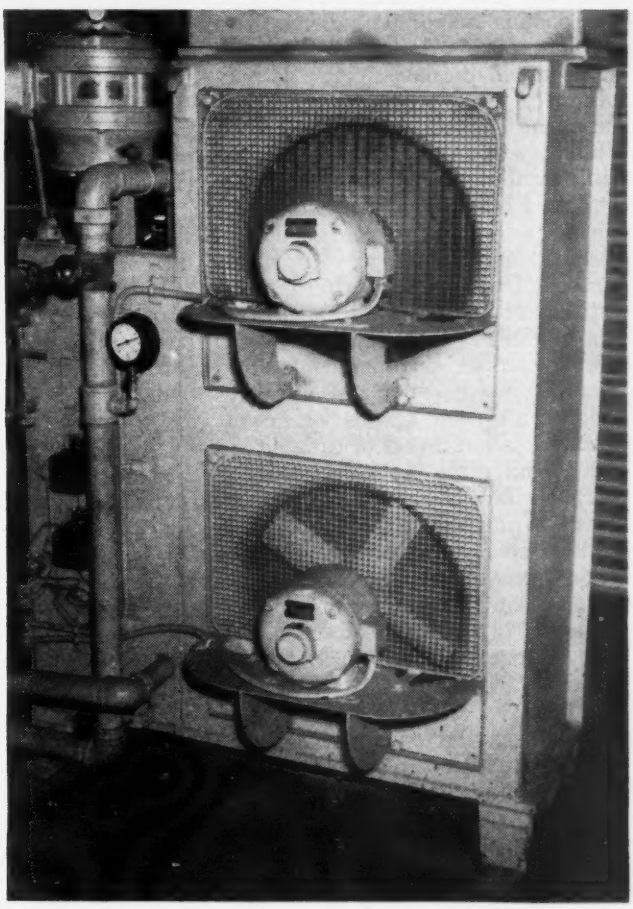


Beyond the power transformer are two six-tube rectifier compartments. The door to the first compartment is open.



A double-pole air circuit breaker in the d.c. compartment disconnects both sides of the rectifier from the external circuit.

Carl Deiter, electrician, holds one of the two rectifier tubes kept as spares for the station.



The lower fan on the water-to-air heat exchanger cuts in when the temperature of water from the rectifier reaches 55 deg. C.

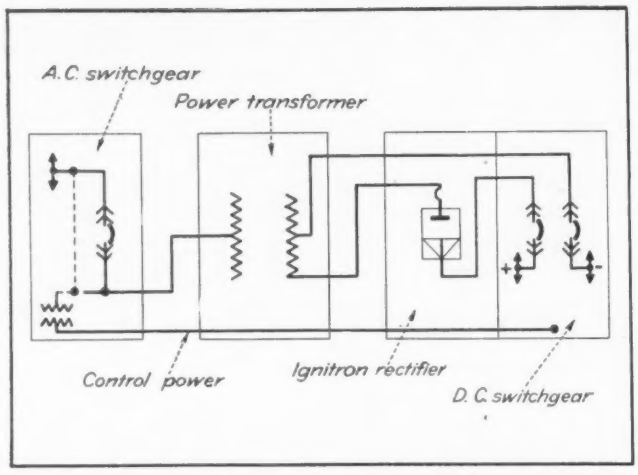


Fig. 2—How the unit substation may be represented by a one-line diagram.

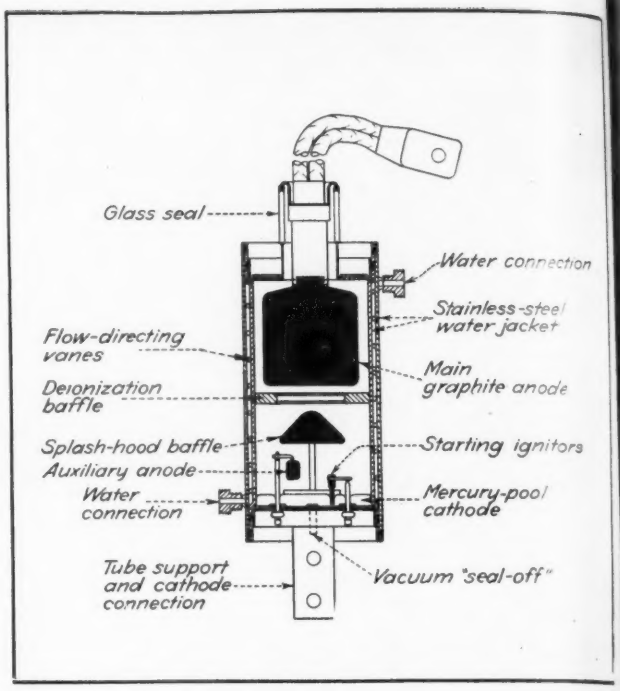


Fig. 3—The elements of each tube are a seamless-steel water-jacketed vacuum chamber containing a main graphite anode, an auxiliary anode, two igniter tips, deionization baffles and a mercury-pool cathode.

handle outside the tank. The rating of the transformer is 100 percent load continuously (60 deg. C. rise), 150 percent for two hours and 200 percent for one minute. The rectifier inclosure houses the sealed ignitrons (twelve tubes), the magnetic-excitation equipment and the connections to the water cooling system. The d.c. switchgear unit consists of a two-pole draw-out air circuit breaker, single-pole line disconnect switch, voltage-regulating equipment, alarm and reset relays, d.c. voltmeter and ammeter.

In describing the rectifier unit, the instruction book states that the sealed ignitron is a mercury-pool cathode-controlled rectifier device in which the control is maintained by a third electrode, or igniter. The elements of each tube are a seamless-steel water-jacketed vacuum chamber containing a main graphite anode, an auxiliary anode, two igniter tips, deionization baffles and a mercury-pool cathode.

The igniter tip (one held as a spare) creates a cathode spot when it receives an impulse from the external excitation circuit and serves to control the time at which the anode current begins to flow. As long as the anode-to-cathode voltage is not exceeded, no anode current will flow until a sufficient current has been forced through the igniter to establish the cathode spot. The igniter requires a positive impulse current once each cycle to start the arc at the beginning of the conducting period of the main anode. To fire the igniters at a predetermined time a magnetic circuit is employed. Once the igniter has initiated the discharge, it has no further effect on the anode current. Control is restored to the igniter when the main-anode and auxiliary-anode currents cease long enough for the mercury to become sufficiently deionized.

The auxiliary graphite anode is located above the mercury pool. After the cathode spot has been created by the igniter, the auxiliary anode functions to maintain the spot for the remainder of the excitation period, or until such time as the main anode functions. This provides sufficient ionization to enable the main anode to carry the load current, even under conditions of light load. During the positive half of each cycle four of the tubes are used progressively to carry the load current.

Proper cooling of the rectifier is most important and one of the best safeguards against arc backs. In this installation, temperature regulation is maintained by a closed water system dissipating its heat by way of a water-to-air heat exchanger. Since the vapor pressure inside the ignitron doubles for each 10 deg. C. rise it is important that the outgoing cooling-water temperature not exceed 60 deg. C. This heat exchanger has two blowers. The second blower cuts in when the temperature of the outgoing water reaches 55 deg. C. A solution of sodium dichromate is used in the water as a rust inhibitor.

Protective devices on the d.c. switchgear announce any disturbances in the ignitron firing circuits by both lights and an alarm. Among the other protective measures incorporated are: (1) a.c. reverse phase voltage; (2) a.c. overcurrent protection (and arc-back); (3) misfire protection (sounds an alarm); (4) low water pressure; (5) moderate overload; (6) d.c. overcurrent; (7) d.c. reverse current; (8) high cooling water temperature; (9) excessive cooling water temperature; and (10) automatic regulation of d.c. voltage.

To afford extra protection to the maintenance crew Kirk interlocks are provided on the doors to the compartments housing the a.c. circuit breaker, the control power transformer's fuses and the d.c. circuit breaker and line disconnect switch.

The unit substation is housed in a modern block structure whose floor is 20x30 ft. The gabled roof is Transite. Louvers and roof ventilators are provided for ventilating the station and all windows and doors are normally kept closed. All circuits entering and leaving the station are protected with lightning arresters.

Philadelphia & Reading operating officials located at the operating office in Pottsville are: George A. Roos, general manager; E. S. Christ, assistant general manager; William C. Muehlhof, chief engineer; John B. Hicks, transportation engineer; Harry A. Leidich, safety inspector; Albert Brown, electrical engineer; C. E. Brown, mining engineer; H. R. Hagen, mechanical engineer; and D. E. Ingersoll, division superintendent. The supervisory staff at the Oak Hill colliery includes: Leo Brady, superintendent; Robert Jones, assistant superintendent; Carl Deiter, electrician; Fred Gilmartin, master mechanic; and Thomas Snyder, foreman. R. E. Taggart, president of the Philadelphia & Reading Coal & Iron Co., has his headquarters at the main office in Philadelphia, Pa.

MACHINE METHODS

Promote Efficiency in Mine Accounting

Punched-Card Accounting Methods Insure Speed, Accuracy, Flexibility, Neatness and Economy — Bookkeeping Machines Are Synchronized With Automatic Punches and Supplemented by Tabulators and Sorters

By JNO. C. McNEIL
Certified Public Accountant
Wheelwright, Ky.

SEVERAL years ago I made periodic visits to a small mine office for regular audits. The payroll clerk was one of the finest old gentlemen and hardest workers I've ever seen. He worked 14 hours daily and ten to twelve hours every Sunday. Vacations weren't possible for him. If there were two ways of doing a job he seemed always to take the hard one. A suggestion that using a fountain pen would save him a lot of time was brushed aside with the comment: "It only takes a second to dip my pen in ink and another second to use the blotter." When I suggested that moving his desk over to the scrip window would save 14 steps each issue (he averaged about 300 a day) his "We've never done it that way" reflected a genuine astonishment that there could be a better one.

Better Way Available

There is a better way of handling mine accounting and bookkeeping for greater efficiency and accuracy. Something about what it is and what it offers is the subject of this article. However, the ideas presented here are not original. The question is merely one of adapting to the coal industry methods used by aviation, the great war plants and the Social Security Board in handling a countless number of Social Security accounts.

Coal-mine accounts fall generally into four principal groups. These are:

1. Accounts receivable.
2. Accounts payable.
3. Property accounts.
4. Payroll accounts.

This article will deal with the first three. The fourth will be discussed in a subsequent article.

1. ACCOUNTS RECEIVABLE—In speaking of accounts receivable we must necessarily deal with the contra-distribution of the revenues involved in these accounts so that when we charge accounts receivable we simultaneously credit a revenue or earnings account with the same figure.

Comparison Best

The invoice is the basis of the charge to the accounts receivable ledger. For purposes of control by management it is essential that data on revenues be provided. Management should know how revenues are broken down by grades of coal, tonnages and gross and net proceeds. Comparison is the best known measure of progress. Therefore, a properly informed management should know how this month's sales compare with the same period last month and what increases or decreases are shown when last year's figures are set beside this year's. Without this yardstick management is working in the dark. Finally, the information should be live and up to the minute. Data that are not available until 15 or 20 days after the close of the period hamper and may prohibit effective action.

The fastest, most accurate system of accounting thus far discovered is based on utilizing tabulating machines. Data requiring hours to obtain by other methods can be secured with tabulating machines in an unbelievably short time. To illustrate the speed with which such work is accomplished, the subsequent article on payroll accounts will show a payroll of 30 accounts with 16 columns balanced and proved that can be produced in 158 seconds. There is no other known method of accomplishing proved results in so short a time.

To return to accounts receivable: Fig. 1 shows an invoice produced by a bookkeeping machine synchronized with card-punch. As will be observed, this is an invoice for a car of coal and to all appearances is the conventional coal sales invoice. However, at the time of writing the invoice a card is punched automatically from which all the data hereinafter described can be obtained. The bookkeeping machine on which the invoice is written carries totals of the tonnages and amounts, and the grand total of the invoice is cross-footed and entered mechanically in the grand-total column of the invoice.

As the invoice is written, the data are punched in a tabulating card or cards by an automatic punch electrically synchronized with the bookkeeping machine. After all invoices are written the automatically punched cards are listed by a tabulator. This machine totals the tonnages and amounts, and these totals are proved with the machine-made totals of the invoices to balance the cards with the invoices. Thus, a total of all the charges to accounts receivable is secured at the same time as a total of all the credits to the revenue accounts.

Machines Reduce Errors

For management purposes the number of tons and amounts received for the various grades should be known. The data can be accumulated daily, weekly or monthly, just as management wants, and within an amazingly short time. The data can be subdivided by mines, by sales offices, by salesmen or by any other desired classification. This means, of course, that the punched cards representing different grades or other classifications will have to be sorted and sorted accurately. To sort by manual methods involves human error. A card for block coal might be thrown into the egg group, or Mine No. 1 might be credited erroneously with coal loaded at Mine No. 2. In the method under discussion the element of human error is eliminated because all sorting is handled swiftly by machine, as follows:

Since it is desired to obtain a report showing the tons sold and the value of the tons sold by different grades, the cards are mechanically sorted by grades at the rate of 420 per minute by a

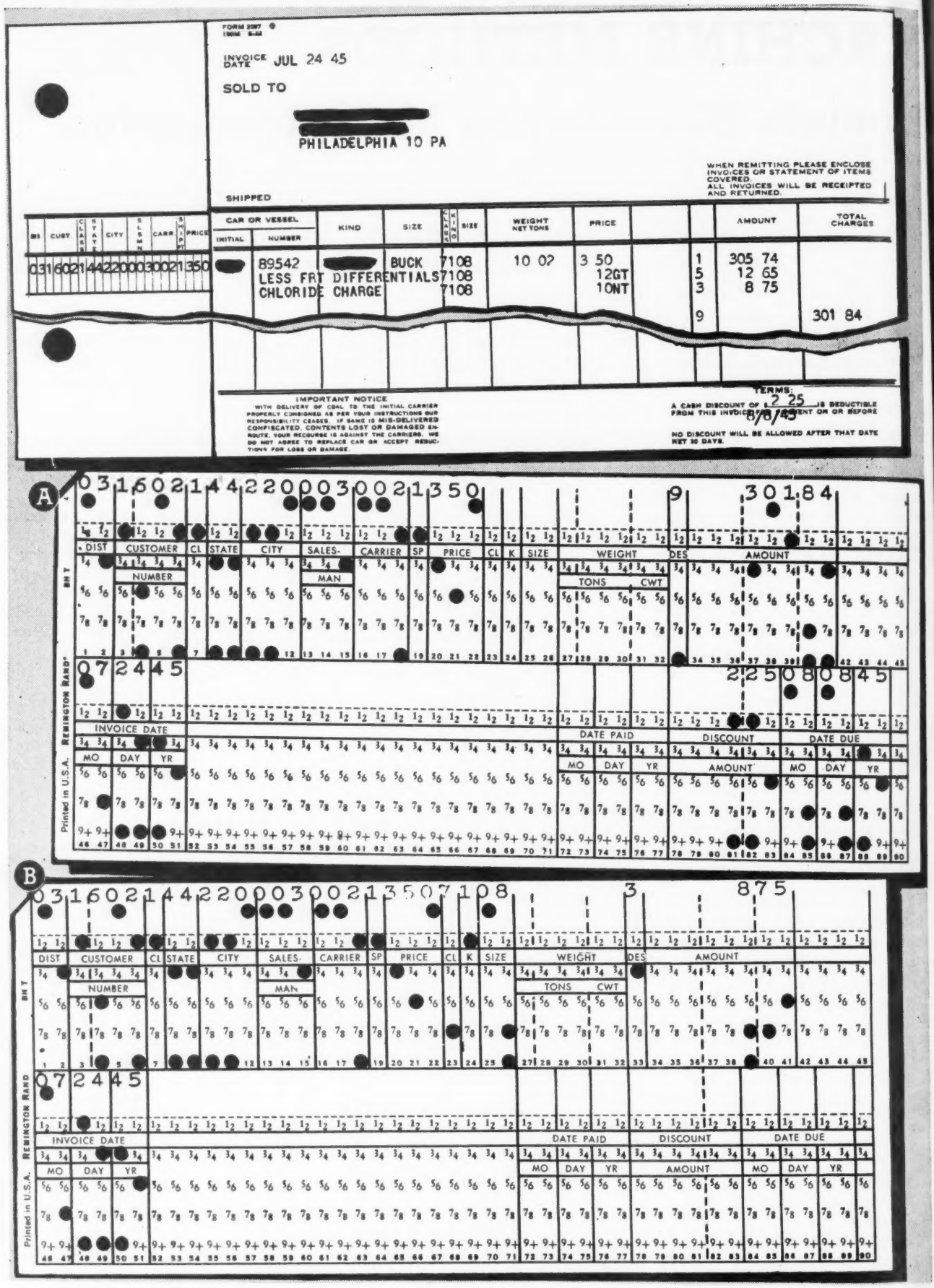
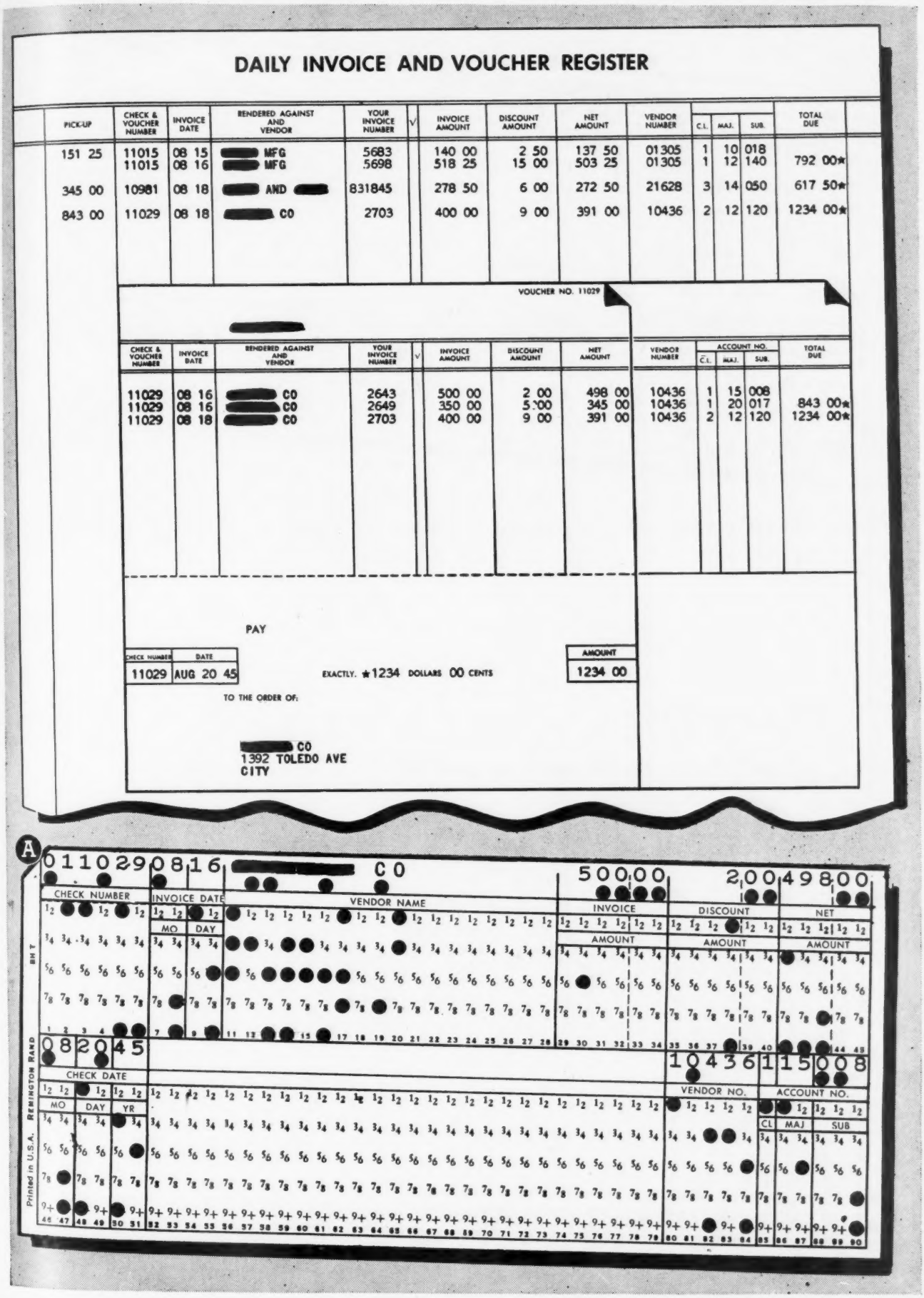

FORM 2097
INVOICE DATE JUL 24 45
SOLD TO
PHILADELPHIA 10 PA
WHEN REMITTING PLEASE ENCLOSE INVOICES OR STATEMENT OF ITEMS COVERED.
ALL INVOICES WILL BE RECEIPTED AND RETURNED.
SHIPPED
BS CUST CLASS STATE CITY SUBM CARR SHIPT PRICE
CAR OR VESSEL INITIAL NUMBER
KIND
SIZE
CLASS KIND SIZE
WEIGHT NET TONS
PRICE
AMOUNT
TOTAL CHARGES
0316021442200030021350
89542 BUCK 7108 10 02 3 50 1 305 74
LESS FRT DIFFERENTIALS 7108 12GT 5 12 65
CHLORIDE CHARGE 7108 10NT 3 8 75
9 301 84
IMPORTANT NOTICE
WITH DELIVERY OF COAL TO THE INITIAL CARRIER PROPERLY CONSIGNED AS PER YOUR INSTRUCTIONS OUR RESPONSIBILITY CEASES. IF SAME IS MIS-DELIVERED CONFISCATED, CONTENTS LOST OR DAMAGED EN-ROUTE, YOUR RECOURSE IS AGAINST THE CARRIERS. WE DO NOT AGREE TO REPLACE CAR OR ACCEPT REDUCTIONS FOR LOSS OR DAMAGE
TERMS:
A CASH DISCOUNT OF $ 2 25 IS DEDUCTIBLE FROM THIS INVOICE IF PAYMENT ON OR BEFORE 8/8/45
NO DISCOUNT WILL BE ALLOWED AFTER THAT DATE NET 30 DAYS.
A
0316021442200030021350 9 30184
DIST CUSTOMER NUMBER CL STATE CITY SALES-MAN CARRIER SP PRICE CL K SIZE WEIGHT TONS CWT DES AMOUNT
07245 2250808845
INVOICE DATE MO DAY YR
DATE PAID MO DAY YR
DISCOUNT AMOUNT
DATE DUE MO DAY YR
Printed in U.S.A. REMINGTON RAND BHT
B
0316021442200030021350710 8 3 875
07245

Fig. 1—This invoice was written on a bookkeeping machine synchronized with an automatic card punch. Data at the left are punched on Card "A," which is used for various tabulations. Showing the amount of the invoice, this card can be used to tabulate total tonnages and the total amount charged the individual customer. Card "B" also is punched simultaneously with the writing of the invoice and shows the chloride charge. Other cards can be punched to show other desired information.



DAILY INVOICE AND VOUCHER REGISTER

PICK-UP	CHECK & VOUCHER NUMBER	INVOICE DATE	RENDERED AGAINST AND VENDOR	YOUR INVOICE NUMBER	V	INVOICE AMOUNT	DISCOUNT AMOUNT	NET AMOUNT	VENDOR NUMBER	ACCOUNT NO. CL.	ACCOUNT NO. MAJ.	ACCOUNT NO. SUB.	TOTAL DUE
151 25	11015	08 15	[redacted] MFG	5683		140 00	2 50	137 50	01305	1	10	018	
	11015	08 16	[redacted] MFG	5698		518 25	15 00	503 25	01305	1	12	140	792 00*
345 00	10981	08 18	[redacted] AND [redacted]	831845		278 50	6 00	272 50	21628	3	14	050	617 50*
843 00	11029	08 18	[redacted] CO	2703		400 00	9 00	391 00	10436	2	12	120	1234 00*

VOUCHER NO. 11029

[redacted]

CHECK & VOUCHER NUMBER	INVOICE DATE	RENDERED AGAINST AND VENDOR	YOUR INVOICE NUMBER	V	INVOICE AMOUNT	DISCOUNT AMOUNT	NET AMOUNT	VENDOR NUMBER	ACCOUNT NO. CL.	ACCOUNT NO. MAJ.	ACCOUNT NO. SUB.	TOTAL DUE
11029	08 16	[redacted] CO	2643		500 00	2 00	498 00	10436	1	15	008	
11029	08 16	[redacted] CO	2649		350 00	5 00	345 00	10436	1	20	017	843 00*
11029	08 18	[redacted] CO	2703		400 00	9 00	391 00	10436	2	12	120	1234 00*

PAY

CHECK NUMBER	DATE
11029	AUG 20 45

EXACTLY. *1234 DOLLARS 00 CENTS

AMOUNT: 1234 00

TO THE ORDER OF:

[redacted] CO
1392 TOLEDO AVE
CITY

A 0 1 1 0 2 9 0 8 1 6 [redacted] C O 5 0 0 0 0 2 0 0 4 9 8 0 0

CHECK NUMBER | INVOICE DATE (MO DAY) | VENDOR NAME | INVOICE AMOUNT | DISCOUNT AMOUNT | NET AMOUNT

0 8 2 0 4 5

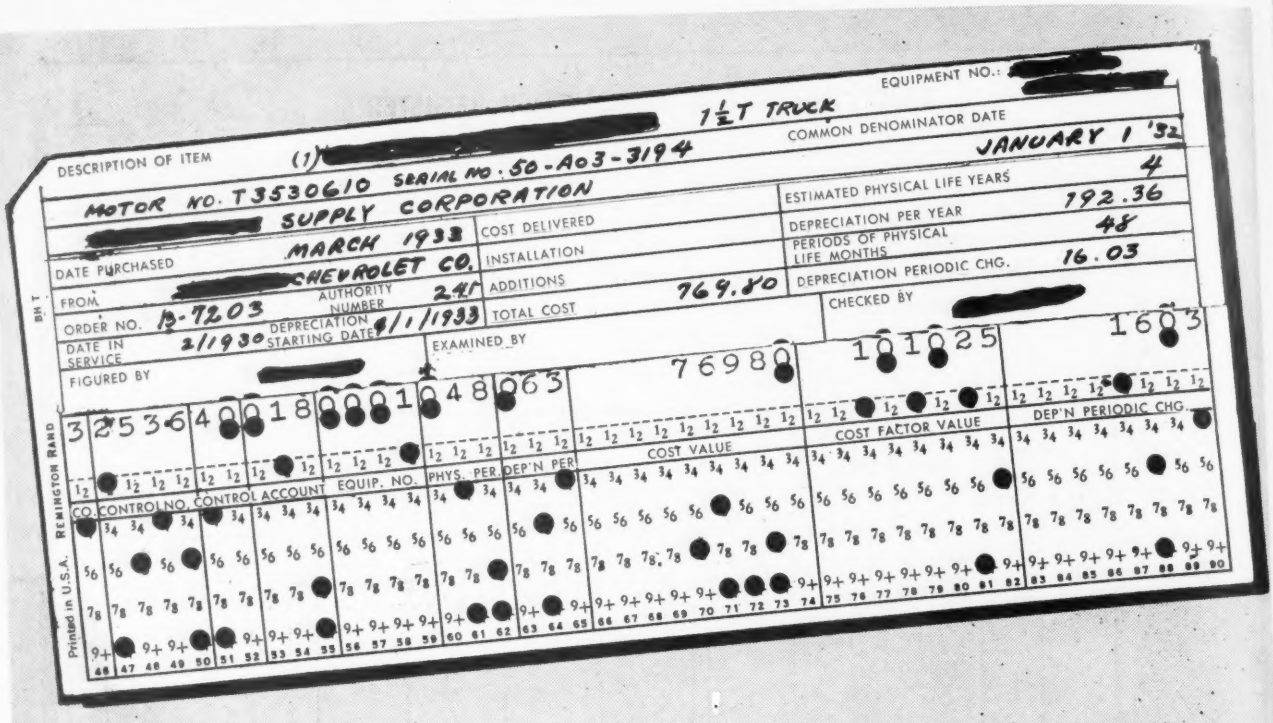
CHECK DATE (MO DAY YR)

1 0 4 3 6 1 1 5 0 0 8

VENDOR NO. | ACCOUNT NO. (CL MAJ SUB)

Printed in U.S.A. REMINGTON RAND BH T

Fig. 2—Accounts payable voucher, duplicate with account distribution and the daily invoice register—all written at the same time on the bookkeeping machine. Simultaneously, a tabulating card, "A," is made by the synchronized card punch.


DESCRIPTION OF ITEM (1) [redacted] 1½T TRUCK
MOTOR NO. T3530610 SERIAL NO. 50-A03-3194
[redacted] SUPPLY CORPORATION
DATE PURCHASED MARCH 1933
FROM [redacted] CHEVROLET CO.
ORDER NO. 12-7203
DATE IN SERVICE 2/1930
FIGURED BY [redacted]
EQUIPMENT NO.: [redacted]
COMMON DENOMINATOR DATE JANUARY 1 '32
ESTIMATED PHYSICAL LIFE YEARS 4
DEPRECIATION PER YEAR 192.36
PERIODS OF PHYSICAL LIFE MONTHS 48
DEPRECIATION PERIODIC CHG. 16.03
COST DELIVERED
INSTALLATION
ADDITIONS
TOTAL COST 769.80
AUTHORITY NUMBER 241
DEPRECIATION STARTING DATE 1/1/1933
EXAMINED BY
CHECKED BY [redacted]
Printed in U.S.A. REMINGTON RAND
CO. CONTROL NO. CONTROL ACCOUNT EQUIP. NO. PHYS. PER. DEP'N PER COST VALUE COST FACTOR VALUE DEP'N PERIODIC CHG.
3 25 36 40 18 1 48 63 76980 101025 1603

A

EQUIPMENT RECORD
DETAIL TRIAL BALANCE

GENERAL LEDGER CO	GENERAL LEDGER CONTROL NUMBER	DEPARTMENTAL CONTROL ACCOUNT ACC'T	DEPARTMENTAL CONTROL ACCOUNT COST CENTER	EQUIPMENT NUMBER	PERIODS PHYS. LIFE	PERIODS DEP'N STOP.	COST VALUE	COST FACTOR VALUE	DEPRECIATION PERIODIC CHARGE
3	25 29	35	4	21	173	173	28 05	19 02	11
3	25 29	35	4	22	49	49	16 50	2 94	6
							44 55T	21 96T	17T
3	25 36	40	18	1	48	63	769 80	101025	16 03
							769 80T	101025T	16 03T
3	25 35	35	31	9			11 00		
3	25 35	35	31	11	53	53	101 95	45 10	85
							112 95T	45 10T	85T
3	25 29	35	40	12	320	320	193 75	150 67	47
3	25 29	35	40	29	308	308	210 00	157 37	51
3	25 36	40	40	2			784 00		
3	25 36	40	40	3			784 00		
3	25 36	40	40	4			784 00		
3	25 36	40	40	5			784 00		
3	25 36	40	40	6			784 00		
3	25 36	40	40	8	26	26	624 10	338 10	13 00
3	25 36	40	40	9	48	52	825 00	893 72	17 18
							5772 85T	1539 86T	31 16T
3	25 35	35	50	10	34	34	14 30	4 03	12
3	25 35	35	50	16	81	81	400 00	271 60	333
3	25 29	35	50	40	226	226	150 00	111 00	49
3	25 29	35	50	42	231	231	167 58	127 27	55
							731 88T	513 90T	449T
							7432 03GT	3131 07GT	5270GT

Fig. 3—The tabulating card, made by the key-punch method, records data on an equipment unit. It is used with others in making various tabulations such as "A," the "Equipment Record Trial Balance," showing charges to the various sub-accounts; "B," the "Summary Trial Balance" (a trial balance of general accounts); and "C," the "Journal Entry."

B

SUMMARY TRIAL BALANCE BY GENERAL LEDGER CONTROLS

CO.	CONTROL NUMBER	COST VALUE	COST FACTOR VALUE	CREDIT DEPRECIATION RESERVE
3	2529	76588T	56827T	219T
3	2535	52725T	32073T	430T
3	2536	613890T	224207T	4621T
		743203GT	313107GT	5270GT

C

DEPRECIATION ENTRY

CO.	ACCOUNT	COST CENTER	DEBIT COST
3	34	4	17
3	40	18	1603
3	35	31	85
3	35	40	3116
3	35	50	449
			5270T

sorter. When the cards have been arranged into numerical sequence by grade they are automatically tabulated at the rate of 100 cards per minute and a report is printed showing the tonnage and amounts by grade, together with grand totals of the tonnages sold and the value of all sales.

An interesting feature of the tabulator is important in this operation. When all the cards for one grade have been tabulated, the machine will stop and print the total number of tons and the total value of the tons sold. At the same time the summary punch attached to the tabulator will punch a summary card, the use of which will be explained later. The same procedure is followed for the subsequent grades. Cards representing the various grades are tabulated and summary cards produced in the same manner for each grade.

Accumulating Speeded

The data obtained from the cards thus far have been monthly, but data also are desired for the period to date. To obtain this, cards for the current month are combined, through the medium of the sorter, with cards showing the previous month's totals and year to date totals. The cards are then tabulated at the same high rate of speed (100 per minute) and the tabulator prints a report showing the tonnage and values for the current month, for the previous month and for the year to date. During this operation summary cards are punched with the totals to date for use next month.

As stated, comparison is the best measure of progress and, therefore, it is desired to compare this month's transactions with the previous month's and this period to date with the same period last year. By punching a control on the previous month's cards they will actuate the tabulator in subtract position. The total of the cards for this month is added in one accumulator, and the total of the cards for the previous month is added in another. The difference is obtained in a third accumulator.

In a few minutes, therefore, it is possible to produce for the management a comparative statement of sales by grades, showing both tons and amounts for the month as compared with the same period of last year. Similar data as to results by salesmen, or sales agencies, or any other information, broken down by mines, can be obtained in like manner. These data are produced in minutes, not hours.

2. ACCOUNTS PAYABLE—Fig. 2 shows the invoice and voucher register, the remittance advice and check and punched card, all written in the same operation. It makes very little difference as to how payments are made, whether at stated dates during the months or according to due dates. The important thing is to get each month's invoices into that month's accounts. The remittance advice is made in duplicate, the original is sent to the vendor with the check and the duplicate is stapled to the invoice it covers and then filed alphabetically. The invoice and voucher register, written in the same operation as the writing of the remittance advice, is the running record of accounts payable. At payment date the check register is filled out simultaneously with the writing of the check, thus making the check register a byproduct of posting of the check.

A card is punched by the automatic punch electrically synchronized with the bookkeeping machine, and when the posting is completed the cards are tabulated for a total and this total is checked with the bookkeeping machine total, thus verifying the accuracy of the cards punched. The cards showing the expenses and debits to accounts can be sorted and tabulated by mines and accounts or by any other classification punched in the cards. The distribution possibilities are limited only by the information that the cards contain.

Same Methods Applicable

The same methods of comparison described under accounts receivable can be used for accounts payable. Statements of expenses, broken down into various distributions with monthly and prior-period comparison statements, can be obtained with the same ease and brevity of time. Data provided are fresh and up to the minute and thus can be used as a management tool. It is obtained while the work is happening and is not a history written 15 to 30 days after.

3. EQUIPMENT AND DEPRECIATION ACCOUNTING—Federal and State income tax laws forcibly bring to the attention of accountants and executives the need for more comprehensive and readily accessible equipment and depreciation records. Fig. 3 shows equipment and depreciation control reports, and a sample tabulating card from which these reports are prepared.

In the illustrations given, Jan. 1, 1932, is shown as the effective starting date of the system. "Period numbers" are in progressive sequence with a number to identify each month from Jan. 1, 1932. A card punched "55" in the "stop-period" field of the card would be withdrawn from the file after all tabulations have been made for July, 1936. This withdrawal can be made by "select sorting" the cards from the files or by compiling a list of all fully depreciated items indicated in the detailed trial balance and manually selecting the cards from the files.

Getting Book Value

Net book value and accrued depreciation can be readily obtained for any period by single items or groups by making a calculation of the cost factor in combination with the depreciation periodic charge. It is possible to make this calculation, regardless of depreciation rates, through the application of the following formula:

Let F = cost-factor value.
D = depreciation periodic charge
N = number of periods from common denominator date.

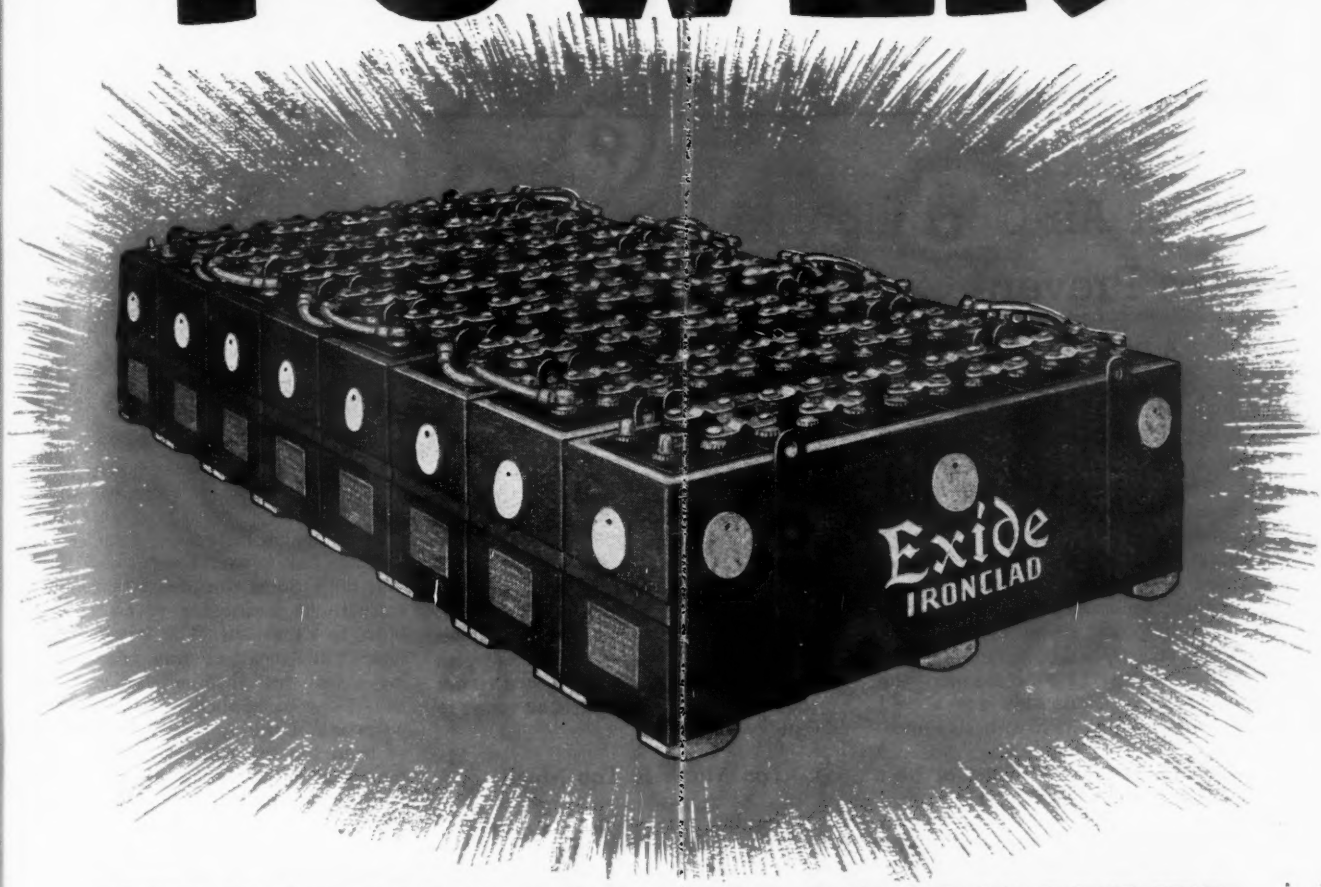
Then, $F - (DN)$ will equal net book value.

The accrued depreciation is obtained by subtracting this result from the cost value. Lack of space prohibits showing calculations in support of these figures, but the writer will gladly furnish this additional information to interested parties upon request.

From these cards net sound values by mines and by groups of equipment can be furnished management in a few hours. The extent to which details are given is dependent entirely upon the desires of management. The addition of a few more cards would mean little to a machine tabulating at the rate of 100 per minute.

Punched-card accounting is nothing more or less than the recording of facts and figures into cards by series of punched holes so that the information, once recorded, can serve repeatedly in the mechanical reproduction of reports and records without further manual transcriptions. This modern method of accounting provides speed, accuracy, flexibility, neatness and economy. Punched-card methods are not really new, since they have been developed over many years, but the benefits of punched-card tabulating machines have been proved conclusively during the war years when their speed was a necessity. Tabulating machines also have been in constant use for many years in government departments, industrial concerns, banks and other institutions, and these users understand their great value. The same advantages, as this article has tried to point out, also are available to coal-mining companies.

POWER



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The Foremen's Forum

Winter Air-Conditioning of Mines Helps Prevent Coal-Dust Explosions

A Damp Winter Like Last Year's Lessens Risk of Explosions—Should Aim for Full Saturation of Air at Mine Temperature

LAST WINTER came and went—almost without a mine explosion until, however, the disastrous explosion in Utah of May 9. The honors for this splendid accomplishment must be divided between mine operators, miners, U. S. Bureau of Mines inspectors, State mine inspectors—and the weather. In winter, the air entering the mines becomes warm and hence is enabled to take up moisture and carry it out of the mines. In this manner, the workings are dried. As this was a cold winter, the mines might have been unusually dry.

However, it also was a winter of high precipitation. Much snow and rain had fallen, and the air had more moisture than is usual in the winter season; consequently the mines were not nearly as dry as they usually are. In the United States, it is the dry cold nights, one following another, that desiccate the mines and make the coal dust in them abnormally dangerous. In Europe, the air is not so dry, but this characteristic does not lessen the hazard as much as the great heat of its deep and extensive mines increases it.

To correct this dryness, either air conditioning or a direct application of moisture to the coal dust is needed. In summer, it is necessary to cool the air to mine temperature to prevent the deposition of water on the mine roof and thus to obviate the deterioration of the latter, and in winter the air must be heated by steam or heated in the presence of moisture so as to bring the air to saturation at mine temperature and so as to satisfy it so completely with moisture before it enters the mine mouth that it will not take any moisture from the mine workings.

In this way the mine will not be dried out and the explosions that work such havoc will be made less likely, though it always is best not to rely on moisture alone but also to apply rock dust. Those who do not wish to sprinkle their coal for fear that the particles and lumps will freeze together on the way to market may prefer air conditioning, though sprinkling if adequate and properly distributed and and appropriately located gives greater assurance from mine explosions. Coal in air which is not oversaturated should have no free moisture and so should enter the railroad car free of ice and congelation.

It was many years ago when the cold winter air was first conditioned to prevent the drying of mines, but after a while the practice was discontinued by many companies, probably because, as performed, it destroyed the roof. Rock-dust distribution, which came into use soon after winter air conditioning, seemed a much better plan to adopt, though companies with wet mines continued to heat their air so as to prevent ice formation.

Too Much Is Too Much

One readily can see that the argument against air conditioning was valid when, so as to be able always to assure the presence of sufficient moisture, an excess of both moisture and heat was used for the humidification of the air. Humidification and heating should not be carried to the extent that it will raise the temperature of the intake and saturate it above the temperature of the air of the mine, because, if it is, the mine will cool this hot air, and moisture will form on the roof just as it does in the summer when the entering air is moist and hotter than the mine temperature. Perhaps, without intending it, the operators who installed winter air conditioning to their own undoing created a summer atmosphere or even more than a summer atmosphere at the mine mouth. Probably, however, they made up their minds that if a job was worth doing at all, it was worth doing well and so overdid it. The effect of moisture on the mine roof at that time had not been studied. Precaution to prevent this excess humidification will prevent damage to the mine roof in most, but not in all, cases. More will be said of this later.

In mines where water is used extensively for sprinkling, the air and coal alike are moist in the part of the mine where an explosion is most likely to occur. At points outby, the risk of an explosion is much less, so the need for sprinkling is not so evident, but experience shows that severe explosions occur at times at such points and unless they are sprinkled they need to be kept damp by air conditioning if such points are on the intake. Extensive sprinkling near the face will keep the return from drying out, but it does not keep the intake moist, and many of the hazards are on the intake, especially with most cases of shuttle-car operation.

In moister climates, winter air conditioning will prevent ice from forming on the floor, rails and shaft guides as well as on the roof. It will prevent accumulations of ice on the shaft walls and will prevent destruction of the shaft lining by frost. However, it is air heating that will produce these desiderata which can be and are obtained without completer air conditioning, but it would seem well to combine both. Some companies, by heating the air without moistening it, lay themselves open to explosions. The job is only half done. Only in a wet mine or one producing a coal dust that will not explode can heat alone be applied with safety. Where water is not readily available from streams or from the mine drainage it can be obtained from the air leaving the mine as it issues from the return airways and meets the cold air of the surface.

In pitching mines or in shafts, the intake air usually should be raised to the temperature of the warmest part of the mine, so that it will not dry the face workings. That will tend to keep the airways at an even temperature throughout. However, if there are still signs of sweating on the roof after a few days that will be evidence that the air is being cooled between the point of heated intake and the point of maximum temperature of the mine, in which case it would be better to lower the temperature a little at the intake, for a damp roof may not be desirable. This caution against overheating the air applies mainly to mines that have not been exposed to moisture in their older parts, and so will react unfavorably to it, even if in small quantity.

When, as in the elevated portions of the West, the rocks have never been exposed to moisture and so scale badly when moisture is introduced, and especially where also the coal may be subbituminous or lignitic and therefore disposed to give off water vapor, it may be best to attempt neither heating nor humidification of the air, but to rely on rock dust entirely.

In such mines, shafts, slopes and drifts usually are dry, so heating the air will not be necessary to prevent the formation of ice. In many of the mines water is not found except perhaps in sections under spots a little lower than the surrounding country and which are thus unprovided with escape channels for the run-off of the rain which falls on the surface. Thus are

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. . . and it looks as if the hungry gentleman above just can't digest that fundamental fact.

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formed pools and small lakes, the water of which saturates the mine rocks, swelling them and giving much trouble. Such conditions, however, are rare.

In some subbituminous and lignitic mines, the moisture leaving the coal may fully saturate the air, even though on entering the mine the air is much undersaturated. The lower points in the mine have more internal heat than the shallower. They have more men and animals to create heat by respiration and radiation. They have more oil safety lamps to warm the air by combustion of oil and methane. Electrical devices also may increase the temperature. Consequently the air leaving such lower workings is warm and has become saturated at that temperature by moisture drawn from the coal.

When the return air approaches the outcrop workings, it becomes cool by inleakage from the surface and by leakage from the cool air of the intake which escapes through stoppings to the return. So the warm saturated air is cooled, and moisture is deposited on the roof with resultant decrepitation. About this nothing can be done apparently without an application of heat. Gunite may not prove a cure, for guniting, being a wet process, may do damage in its application to such extremely water-sensitive roofs. Paint might help if applied when the roof is dry.

In some lignite mines in which the coal is of high moisture content humidification may be desirable to prevent the drying out of the moisture in the seam, because, when the lignite so dries, it causes the pillars to split and spall into a series of disconnected columns, about the size of a strong prop, too small to bear the loads laid upon them. What is good for the coal, however, may be bad for the roof, floor, or partings, and some Western mines have bentonite, that swells abnormally if moisture is present.

To sum up: In a mine not having excessive temperature, there are advantages in conditioning the air by raising the mine temperature at the intake up to or nearly up to the maximum mine temperature in areas under operation and by saturating it with moisture at that temperature: (1) the mine will not dry up and thus create an explosion hazard; (2) the miners will not be exposed to piercing blasts of air when being hauled to the surface against the intake current; thus they will be less likely to suffer from pneumonia and other respiratory diseases; (3) the rooms provided for men waiting to be hoisted to the surface or to be hauled inside the mine to their working places will be warm, comfortable and healthful; (4) the water flowing out of the mine will not freeze in the ditches and in the pipes by which it is conveyed; (5) the cross-section of the airways and shaft will not be reduced by the freezing of mine water or by the formation of icicles and (6) the roof will not be weakened by temperature changes. The last (considered so important by some) is shown by experiment and experience not to be of great importance and so is placed last in this category of advantages.

In mines where water is used extensively for sprinkling, the air and coal alike are moist in the part of the mine where an explosion is most likely to occur. At points outby, the risk of an explosion is much less, so the need for sprinkling is not so evident, but experience shows that severe explosions occur at times at such points, and unless they are sprinkled they need to be kept damp by air conditioning, if such points are on the intake. Extensive sprinkling near the face will keep the return from drying out, but it does not keep the intake moist as does air conditioning and many of the hazards are on the intake, especially with shuttle-car operation.

•

Would Use Explosion To Control Mine Fire

That an explosion initiated by a detonator or other primer fired electrically from the surface or by a delayed-action fuse, time fuse or electric contact should be used as a means of creating an atmosphere that would suffocate and thus control a mine fire was suggested by H. Price in a paper read before the Manchester Geological and Mining Society, in England, as a means of assuring such a low oxygen content around such a fire as would prevent a more violent and less controllable explosion and so make it safe to operate the mine promptly.

The scheme apparently has never been tried, and its value is limited to preventing a disaster. It would not create such an atmosphere as would extinguish the fire, though it might shorten its duration and make its extinction relatively free of risk, after barriers have been erected against the preventive explosion and that explosion has been effected safely as planned. Its advantages are: (1) that the one and only explosion can be definitely timed when all men including the persons fighting the fire have withdrawn to the surface and (2) that the preliminary deoxidation of the air can be hastened materially, thus shortening the life of the fire and the delay in operation.

The author suggests that a combustible, either solid, liquid or gaseous, be used as an explosive. His preference seems to be to place in a steel drum, 3 ft. long and 2 ft. in diameter, 23.7 gal. of gasoline (petrol) and 35.5 gal. of diesel oil or shale oil—a 40:60 mixture. The charge, he declares, might consist of 8 oz. of Ammonal with guncotton or a tetryl primer with No. 8 detonators or 16 oz. of unsheathed ammonium nitrate with No. 6 detonators to ignite 8 to 12 oz. "electron" turnings or magnesium shavings. The explosion would be controlled by a tight housing of sandbags. It is purposed by the explosion to reduce the oxygen in a few seconds to 12 percent or less and thus make conditions safe for quickly resuming operations. The fire would have to be quite small, a mere "gob-stink," or it might cause an explosion before the sandbag inclosure would be completed.

•

Higher Altitudes, More Tidal Movement

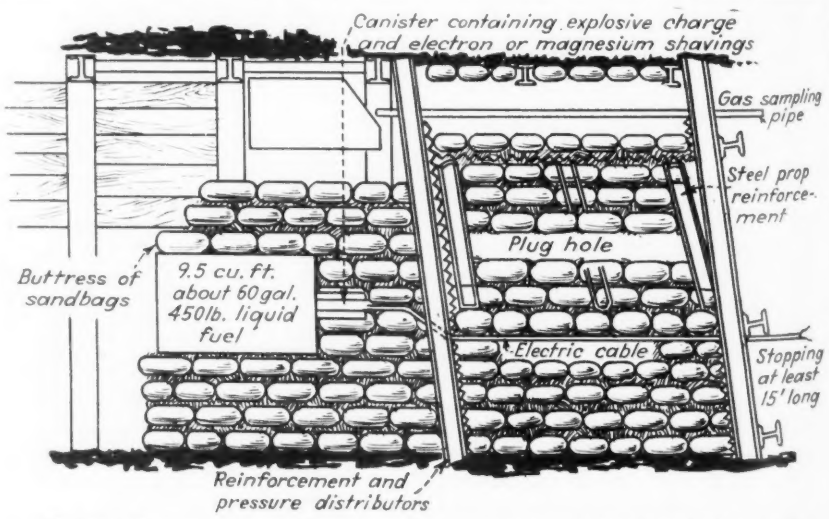
In all problems regarding "tidal air movement," which may be defined as the flow of air resulting from changes in atmospheric pressure—a flow that governs the escape of methane from goafs—the entry of air into goafs, sealed or unsealed, and the revival or extinguishment of mine fires, it is necessary to consider the elevation of the mine workings. A fall of an inch of mercury at sea level will make the air in the goaf expand one-thirtieth whereas the same fall at an elevation of 8,000 ft. would result in an expansion of as much as, roughly, one in every 22 parts of the volume of the goaf, as will be evident from the accompanying table.

EQUIVALENTS OF 30 IN. OF MERCURY AT SEA LEVEL FOR VARIOUS ALTITUDES ABOVE TIDE

(Simons' "Compressed Air")

Altitude, Ft. Above Sea Level	Barometric Pressure Inches of Mercury
0	30.00
1000	28.88
2000	27.80
3000	26.76
4000	25.76
5000	24.79
6000	23.86
7000	22.97
8000	22.11
9000	21.29
10,000	20.49

Courtesy, McGraw-Hill Book Co.


Canister containing explosive charge and electron or magnesium shavings
Gas sampling pipe
Steel prop reinforcement
Plug hole
Buttress of sandbags
9.5 cu. ft. about 60 gal. 450 lb. liquid fuel
Electric cable
Stopping at least 15' long
Reinforcement and pressure distributors

Suggested means of providing a small preventive and timed explosion so as to foul the air and prevent a larger more dangerous and more disastrous explosion. Interior view of the sandbag explosion chamber.

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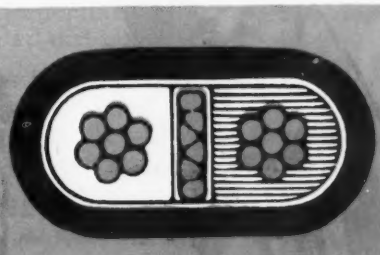

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State-Board Questions

Mine Foremen, Alabama

Q.—What are four of the disadvantages of high-velocity air currents?

A.—(1) A high-velocity air current may extinguish a lamp, especially a safety lamp. If the latter goes out, the man who is using it for detecting methane or carrying it to afford light for his work will have to come to a safe place, to a safety-lamp station inside the mine or to the surface to reignite it. Unless he has another light, the trip may have to be made in the dark. Of course, he should, and almost all do, have an electric safety lamp as well as a flame safety lamp, for he needs the most effective and safest illumination.

Thus the extinguishment of the lamp will interfere immensely with his work, his safety or both, so he is likely, with disastrous results, to violate rules and his better judgment, and relight the lamp, not far from the point where it was extinguished, doing so in such a dangerous atmosphere that the explosion of gas within the lamp will drive the flame through the gauze or will blow the gauze or glass to pieces and thus communicate flame to the methanous air outside the lamp, causing a mine explosion. A violent explosion in the lamp may cause its user to drop the lamp and break the glass surrounding the wick, and this may cause an explosion outside the lamp.

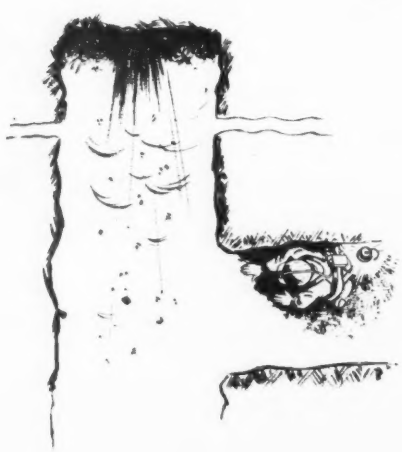
Risk of extinguishing the lamp is increased when it is swung, dragged or bumped or when its level is changed suddenly, as when its bearer stumbles or when he walks against the air current, or when a shot makes the air vibrate or increases the velocity of the air or when the air passes through a narrow, low or both narrow and low crosscut or between cars and rib. These several causes may become operative at the same time, as in passing through a low, narrow crosscut, in a doubled-up position that invites stumbling, and even banging of the lamp on the floor, at a time when a heavy, though distant, shot is fired. Thus, this may combine to put out a lamp, if the average speed of the air alone cannot do it. So the normal speed of the air should be kept well below that at which a lamp would be extinguished. But even then it may go out.

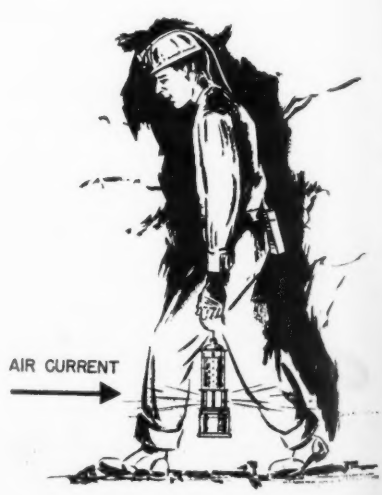
(2) A high-velocity air current in a methanous atmosphere may reduce the safety afforded by a safety lamp. Safety lamps are tested by safety bureaus in air traveling at various velocities and at various angles to a horizontal plane, because it is recognized that high velocity and direction of travel affect the safety of a lamp.

(3) A high-velocity air current will stir up coal dust and maintain it in suspension. This dust, when ignited by a light, an electric arc or a flash of ignited methane may cause a coal-dust explosion. Rough heading surfaces and timbers create miniature mine tornadoes, the air of which travels in circular paths many times as rapidly as the tornadello itself, thus sweeping coal dust off ledges, cross timbers and accumulations on rail, cars and floor.

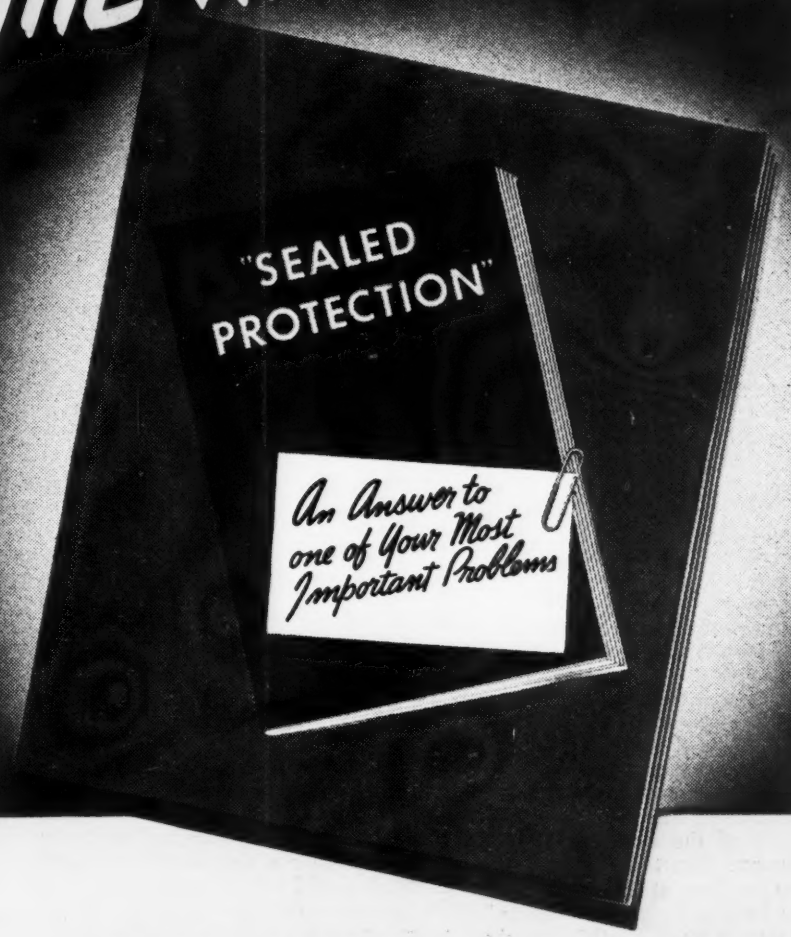
Spaces between cars and ribs create both bottlenecks and tornadellos and, because the position of cars changes frequently, the deposition of coal dust is followed by conditions favoring its erosion by air and its disposal in clouds in the mine atmosphere. There also are partial vacuums within these tornadellos, and thus the dust conceivably may be raised within them, as water is raised by a waterspout.

(4) A high-velocity air current involves a high resistance to the passage of air, and consequently much power is needed to drive the fan at the high water gage required both to overcome this resistance and to provide enough air to compensate for the excessive leakage of air through stoppings consequent on such pressure.





HERE'S THE ANSWER!



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Mine Foremen, Ohio

Where Methane Is Found

Q.—In what part of the mines is methane usually found?

A.—(1) Along the roof; (2) in rising places; (3) near working faces; (4) in badly ventilated goafs; (5) in dead ends of rooms and headings where the methane comes out of the coal and is not displaced by passing air; and (6) where falls have left high places in the roof that the air current cannot sweep.

Weight Half That of Air—As the coal bed is the original source of all the methane in the mines, that gas will be found in quantity around the working faces of methanous operations, provided it has not been blown away by air currents or displaced by diffusion of heavier gases. Its specific gravity is 0.555 as compared with air. Thus, it is a little more than half as heavy as air; 555 lb. of methane occupies as much space as 1,000 lb. of air. Methane being thus light, it rises and is found along the roof of the working place and if some of the roof has fallen, the methane will rise into the pocket thus created and it will be difficult to remove it by ventilation.

Travels by Many Roads—While coal is the original source of methane, that gas may make its appearance in crevices in the roof, having arrived there from the seam being worked or from some other seam or from a mere rashing of mixed coal material and rock. Sometimes these roof occurrences are quite important and dangerous, but most of the pockets derive their methane from the face of the workings and the ascent of the gas. Sometimes the methane escapes from the floor, at times being held in extensive crevices designated "blisters." Where the floor is covered with water, the methane may, as it were, boil up through the pool as if generated in the water.

Crushed Coal Releases Methane—Methane escapes rapidly from coal newly broken, whether the result of a fall of coal or of mining or shooting or both. Borings, bumps and squeezes dislodge much methane and comminuted coal. Some crevices discharge so much methane that work in the places when such crevices are tapped may have to be suspended for several days or even months. But this latter condition is rare.

How Methane Fares in Goaf—Badly ventilated goafs are often plentifully supplied with methane from the ribs, roofs and floors by which they are surrounded and from the crushed pillars, slack and coal-carrying refuse they contain. They usually continue to retain their methane if they are not bled out by cross ventilation through bleeders, for, if no methane or other gas is added to the goaf, the gases do not expand enough to escape when a decrease of air pressure occurs. The air that was brought in earlier by high atmospheric pressures is the gas that escapes first when the pressure is lowered, especially when the goaf is on the rise side of the heading, as it usually is.

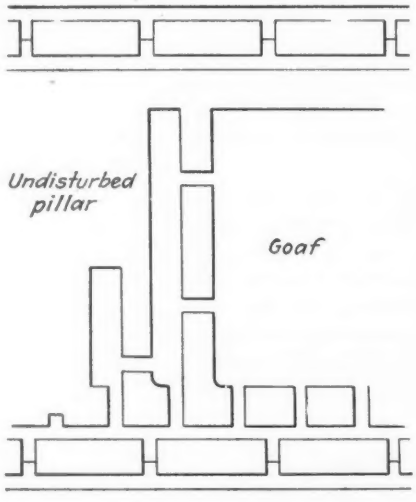
When the roof breaks to the surface so as to cause (1) a subsidence by bending or (2) a complete descent of the entire roof from mine to surface, the methane is discharged into the mine. In the first case, the volume of methane is then decreased but not the percentage of methane in the goaf. In the second case, the goaf air may thereafter be intake air brought in through crevices from the surface, an argument in favor of complete extraction with consequent complete subsidence.

Room and Pillar Widths

Q.—When planning the workings of a mine, what governs room and pillar widths?

A.—Four conditions must always govern width of rooms and pillars when a mine is being planned: (1) The weight of the measures above the coal seam, which is practically proportional to the depth of that "overburden"; (2) the strength of the immediate roof and floor; (3) the strength of the coal bed and (4) the length of time the pillars are required to carry the load. The advent of mining machinery, the introduction of the triple shift, the ability to drive a room without lifting bottom, and the use of metal roof supports as posts and beams have made this fourth factor a dominant consideration, for now a room that used to be driven up in six months or a year can be completed in a few days.

In some few mines, the pressures are so great that headings cannot be kept open whether driven wide or narrow and, in consequence, longwall workings are preferred to room-and-pillar workings. Where, however, roof, pillars and floor will permit of excavations of the latter type, and that always is possible in the present Ohio operations, it should still be remembered that the pressures even in relatively shallow mines are so extreme that no civil engineer would feel safe in providing such small pillar footages for buildings of heights as great as those of mine overburdens, despite the hollowness of such buildings contrasted with the solidity of the earth



Vigorously driving two rooms at a time, the practically undisturbed pillar lies close up to the pillar to be drawn. Many squeezes occurred because rooms were too many and pillars stood too long.

measures. The floor usually is of clay that, however hard at first, has a soft consistency later. The inability of the floor to support the coal and therefore the roof was particularly in evidence when the coal was low and the clay was exposed in driving the room road and when the rock having to be handled made the progress of the room extremely slow.

Limit Percentage Removal of Coal—For these reasons, the proportion of coal removed by room workings from the panel of which it forms a part in general should rarely be more than 50 percent, and pillars that have long to stand should be of such size that the clay, being under pressure beneath the pillars and relieved of pressure under the rooms, will not squeeze out beneath the pillars and pass into the room roadways.

When working places were still being driven up without mechanical aids, when operations were conducted on a single shift, when a large number of rooms were being extended side by side, often on both sides of an entry, when the rooms cut into each other because they were not driven in orderly parallel lines, thus leaving little or no pillar between them, and when no care was taken to withdraw the pillars in regular steps, the support often was inadequate and squeezes followed.

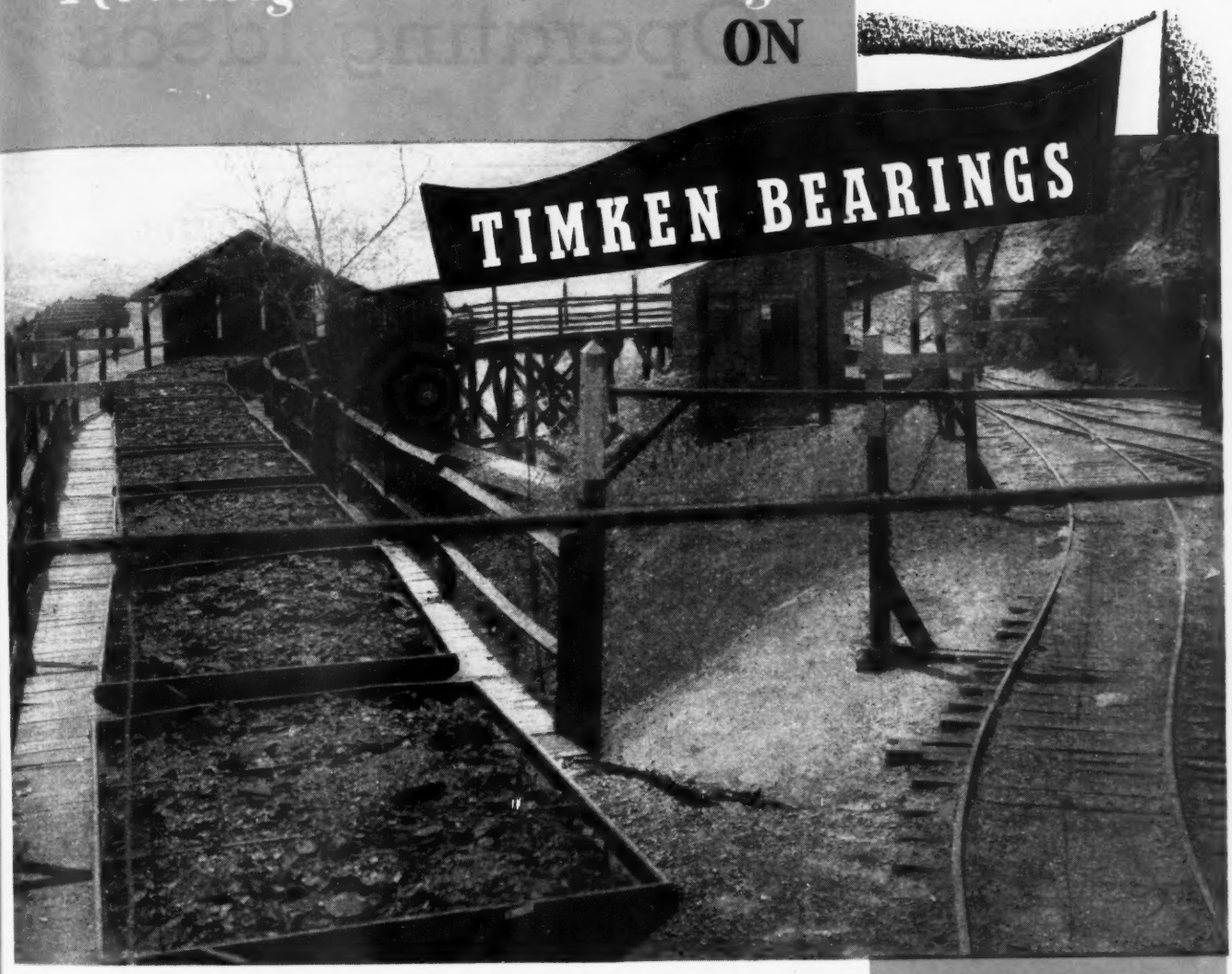
Fewer and Quickly Drawn Rooms—On the other hand, today, with mechanical cutting, drilling and loading, double or triple shifts, quick placement of cars, better room alignment and fewer rooms, the speed of room advance is so great and the pillar removal so prompt that little time is left for deterioration of roof, coal and floor, and squeezes are avoided despite percentages of extraction in preliminary or "first mining" that would have been wholly inadequate with the conditions they have displaced.

Shorten Gap Between Goaf and Virgin Coal—Where only two to six working places are driven from a heading, the gap existing between the edge of a tight cave in the goaf and the far side of the inby working place is so small that the width of the room pillars can, if desired, be reduced with safety. Such small pillars will have the advantage that they can be drawn back quickly when the room is finished. In some few mines this method of operation has been pushed to its limits and only one or two rooms in an entry are working at one time; in this case, one room is nearly complete when the next room inby is half driven.

Comparing this method with the system using several rooms and pillars, it will be noted that the outby support of the latter is just as distant and unreliable as with the fewer rooms and pillars. The strong point in favor of the reduction in the number of rooms and pillars is that the pillar about to be drawn is close to coal that has never been disturbed. One side is more secure even if the other is as insecure as ever.

This reduction in rooms and pillars may be using the advantages of speed to the limit, but its effect on production and haulage possibly may render it inadvisable. However, it forestalls roof and floor deterioration and it provides for a minimum span over areas still operating.

Rolling out the tonnage ON TIMKEN BEARINGS



The Gay Coal & Coke Company, Logan, W. Va., is well-known as one of the more modern and successful bituminous operators. The photograph was made at their No. 3 property, a comparatively new mine located at Mount Gay, Logan County, W. Va.

This mine has an average daily production of 1,200 tons, all of which is handled by 35 Timken Bearing Equipped drop bottom type cars manufactured by the American Car & Foundry Co. A few of these cars are shown in the photograph.

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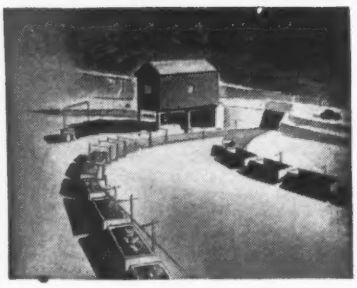
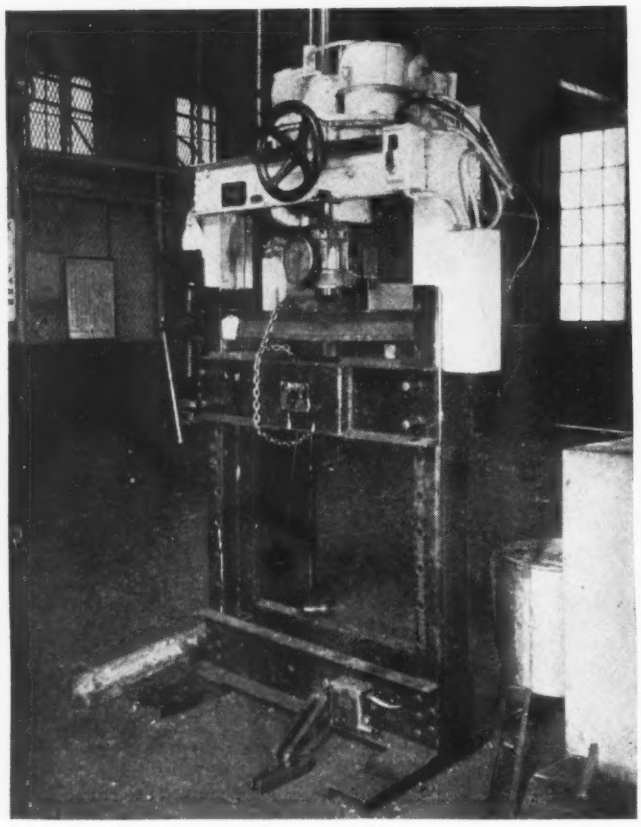
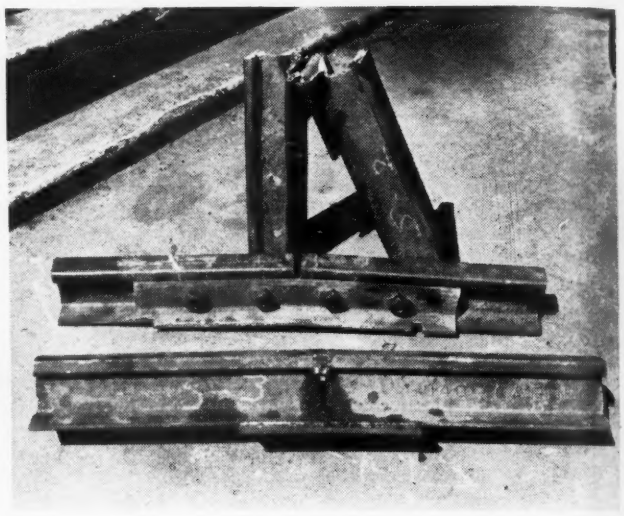
Make Timken Bearings a "must" when buying new mine cars; and see that the trade-mark "TIMKEN" is stamped on every bearing that goes into them. The Timken Roller Bearing Company, Canton 6, Ohio.



Operating Ideas

Back-Up Clips Improve Welded Rail Joints





Rail in the foreground, arc-welded by the latest method, bent on the 24th cycle on the 41-ton step. Double-angle bar joint bent at the first application at 10 tons. The old rail, arc-welded by the latest method, broke at 47th application of the 33-ton step.

Rail being tested in 60-ton electric-hydraulic press in Library shop. The press has an adjustable pressure switch and a timing relay to make repeat applications.

BACK-UP CLIPS or plates on both sides under the head of the rail have greatly increased the strength of arc-welded joints in mines of the Pittsburgh Coal Co. Breakage in service consequently has been reduced to a small percentage of the average with the first joints installed. The new method was first tested in the Library shop of the company, using a standard hydraulic press with modified controls. The joint welded by the new specification is several times stronger than a double-angle bar joint and approximately equals the strength of solid rail.

The drawing (60-lb. rail) is taken from the instruction sheet for this improved double-clip method by which rails are now being welded in mines of the company. The following paragraphs are included on the sheet:

1. Make a 60-deg. vee cut with welding rod on heads of both rails. Clean vee cuts and ends of rails thoroughly with chisel and wire brush.

2. Match ends of rails, leaving $\frac{3}{8}$-in. gap. Spot-weld the $\frac{1}{2}$x6x11-in. mild steel plate to edge of base of rail on both sides, centering plate on gap and rail. Use Fleetweld $\frac{3}{16}$-in. No. 7 rod or equivalent. *Spot a $\frac{1}{4}$x1x1-in. bar or clip on each side of the rail under the 60-deg. vee cut in the ball.* This is to form a base for the weld metal applied to the ball.

3. Weld the gap in the ball, the gap in the base and the base to the $\frac{1}{2}$x6x11-in. plate under the rail, alternately, using up one rod on the base and one rod on the ball until completed. When welding the gap in the base of the rail run the beads from edge of the base toward the web, applying beads alternately on opposite sides of the web. Weld three complete beads on the edge of the rail to the plate in the direction of the arrow, applying beads alternately on opposite sides of rail and the gap. No. 1 beads should be completed throughout before starting No. 2 beads. When welding the ball, weld up the vee by successive beads with the same rod.

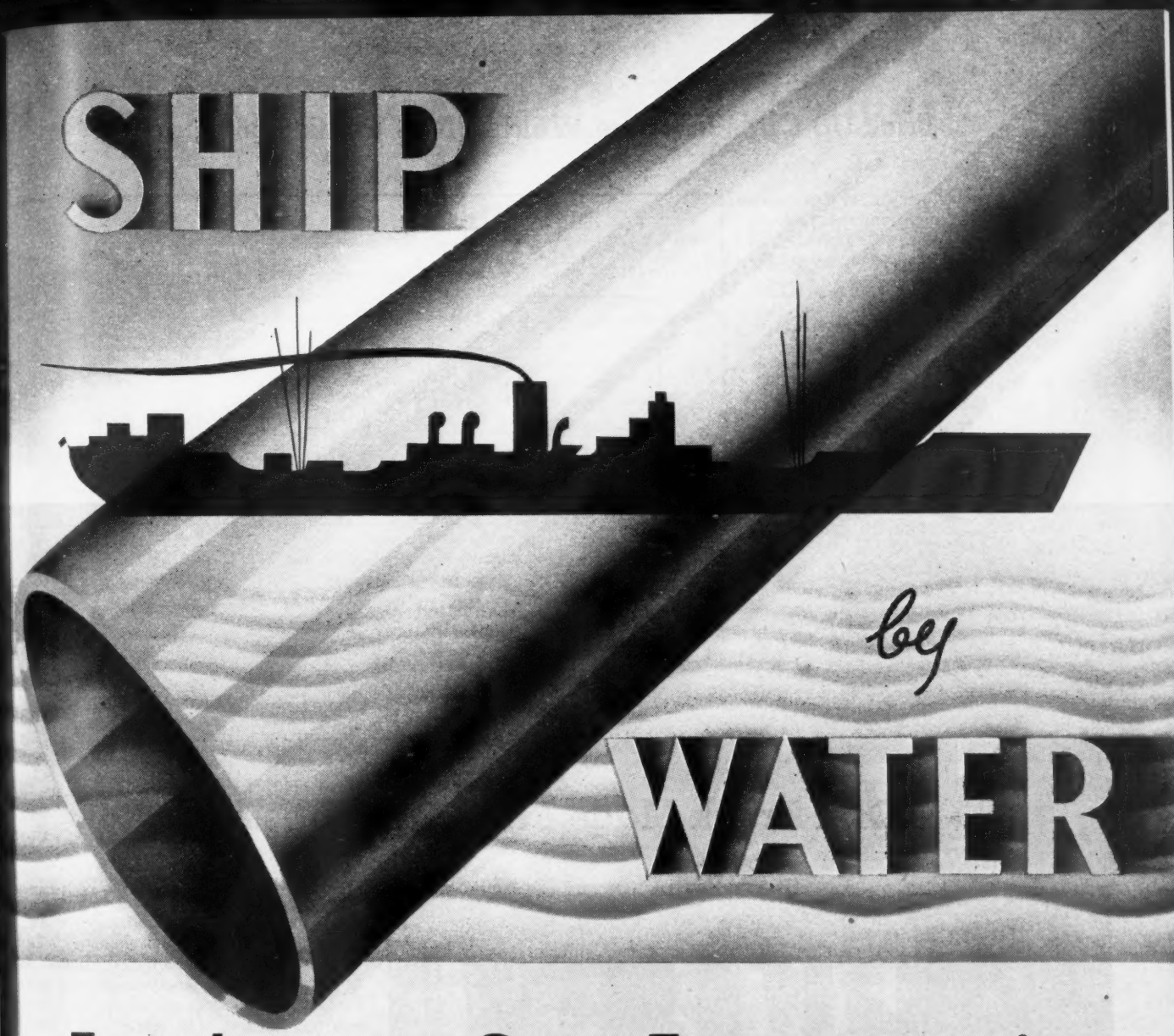
4. Peen the weld in the 60-deg. vee cut, while last bead is hot, until smooth and uniform with rail head on each side. Grind top of rail to provide smooth track surface.

5. If a harder track surface is desired use Hardex No. 45 rod for the last bead on top.

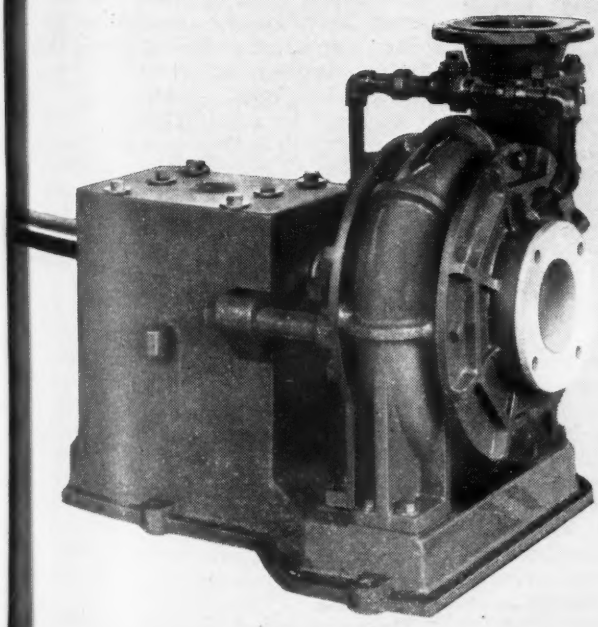
6. Do not weld up the web.

Arc-welding of rail joints was started in mines of the company in March, 1942. When the numerous broken joints showed up after some months of service an investigation, including laboratory or shop tests, was instituted under the direction of Lee Barrett, maintenance engineer, whose office is at the Library shop. The trouble was traced to inexperience and poor workmanship in welding and not following the specifications closely. Shop tests, however, indicated that perhaps the method could be bettered, and as a result the back-up plate thickness was increased.

To duplicate in a large measure the repeated and varying stresses that a job gets in haulage service a 60-ton Lemco vertical hydraulic press in the Library shop was



For Lowest Cost Transportation



From time immemorial; yes, and through World War II; yes, and even as far as we can see into the future, water predominates for providing the lowest cost transportation of large tonnages. But nowadays you don't need an ocean, or a lake, or a river, or even a boat to obtain this economy. You can simply load the material into a Hydroseal Pump, which propels it through a pipeline to wherever you want it. Distance and terrain mean nothing, and if the water used for pumping is scarce, it can be reclaimed and recirculated. No roads or bridges to build and don't forget the further saving in that Hydroseal pumping is a one-way transportation system with no empty return trips. If you have a problem of getting coal to your tipple or breaker or in the disposal of rock refuse or culm, especially to keep within State Anti-Silt Laws, better see one of our engineers. Write us. We'll send Catalog 140 right away, so you can see how the Hydroseal Principle and Maximix Rubber make the pumping of abrasive material reliable and economical.

HYDROSEAL

THE ALLEN-SHERMAN-HOFF CO., 231 S. 15th Street, Philadelphia 2, Pa.

Offices and Representatives in every Coal Mining District in the United States.

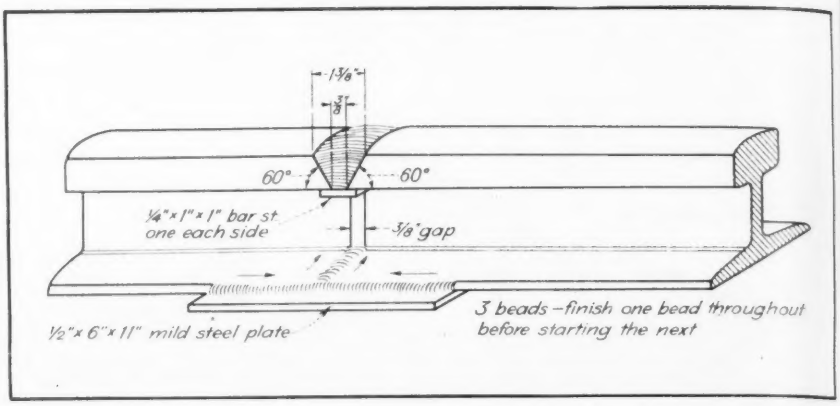
Back-Up Clips Improve Welded Rail Joints *(Continued)*

fitted with a timing mechanism that causes the ram to exert a predetermined pressure, then release and repeat, with a cycle of 38 seconds. Adjustment of a contact pointer on a dial gage sets the pressure to be exerted.

While under test the section of rail or joint rests on two short pieces of 1½x1½-in. soft steel bar with a span of 30 in. On top between the ram and rail is another piece of bar stock the same size. The rail or joint is tested two ways—the ball under tension and the base under compression and vice versa.

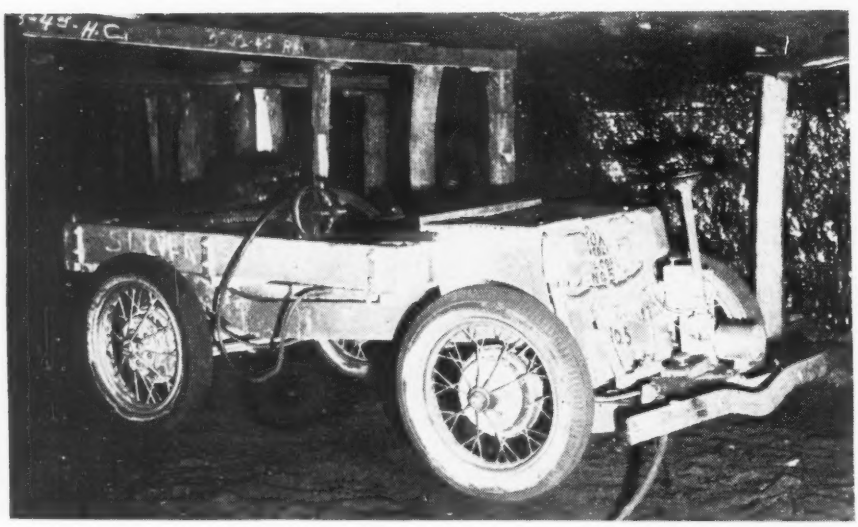
The three joints shown in one of the halftones, one of which is broken, are all for 60-lb. rails. That in the foreground, made from new steel, bent ¼ in. in. the 24th cycle of the 41-ton setting. It had undergone 758 applications at 20 tons, then numerous 38-time applications at increases of 1 ton each.

The double-angle bar joint, also of new steel, bent with the very first application when the pressure reached 10 tons. The broken joint is another made by the new arc-welding specification but using old steel that has seen service in a mine. It broke on the 47th application of 33 tons. It also had undergone the 758 applications at 20 tons, then the 38-time applications at the successively increased pressures before its final failure.



Arc-welding of 60-lb. rail joint using a plate on the bottom and back-up clips under the head.

Drill Truck Made From Car Chassis



Drill and supply truck was made from an old car chassis.

A MOTOR-DRIVEN TRUCK fashioned from an automobile chassis facilitates handling mine drills and supplies underground, writes Thomas Jones Jr., chief electrician, Mine No. 5, Knox Consolidated Coal Corp., Bruceville, Ind.

The truck, three of which are in service, is shown in the accompanying illustration. A Ford Model A chassis complete with wheels, transmission, differential and steering gear served as a foundation for the truck. The width of the original frame was not changed but the front-axle assembly and the cross member were moved back to within 6 ft. of the rear axle. This change left 32 in. of the frame overhanging the front axle. After making V-cuts this part of the frame was bent down against the front axle and cut off 12 in. below it. This last 12-in. section of the frame was bent up to form a step and to accommodate the front panel. Three steel plates ⅜x12x33 in. long were placed on the front end of the truck. One serves as a step while the other two make the front panel.

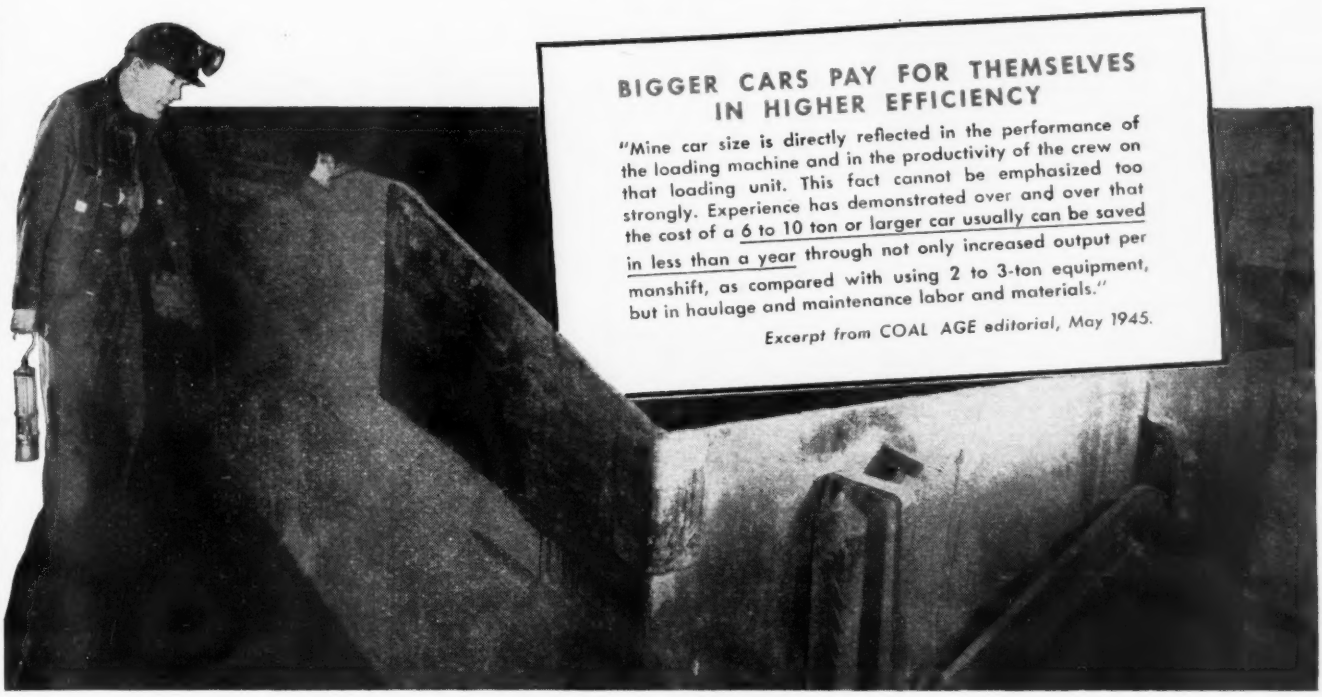
The car's differential was not disturbed but the clutch housing was removed and the clutch turned on its side. A ½x2-in. steel brace fastened to both sides of the frame steadies the clutch housing in its new position. A 2-hp. a.c. motor is mounted above the transmission and rests on two ¾x4-in. braces connecting the frame and transmission. The motor with a 4-in.-diameter two-groove V-belt pulley powers the truck through a 12-in. pulley keyed to the input shaft of the transmission. Slots in the braces on which the motor is mounted permit adjustments of the V-belts. The motor is protected with ⅜-in. plates. The truck is completely arc-welded.

The steering gear, cut down to 20 in., is supported by a ⅜x10x20-in. long steel plate which rests on the step and is fastened to the frame. The drag link was shortened to 12 in. The truck's bed, consisting of wood and steel braces, measures 4x6½ ft.x6 in. deep.

The controls for the truck consists of a starting button made from the car's starting button, a Colt No. 2 magnetic controller, a Cutler-Hammer reverse switch and a foot brake for the rear wheels. Two General Electric 115-volt 150-watt projector-type floodlights are wired in series with a 95-ohm rheostat. The housings for these lamps are made from 5-in. pipe cut in 7-in. lengths. Two 3-conductor Miller connectors stationed on the side of the truck are for plugging in the drills. A 3-conductor No. 12 rubber-covered cable is used to run the truck and to supply power for the drills.

The entire cost of the truck, including labor and material, says Mr. Jones, amounted to approximately $300.

IF YOU WANT BIGGER OUTPUT, USE BIGGER CARS


BIGGER CARS PAY FOR THEMSELVES IN HIGHER EFFICIENCY
"Mine car size is directly reflected in the performance of the loading machine and in the productivity of the crew on that loading unit. This fact cannot be emphasized too strongly. Experience has demonstrated over and over that the cost of a 6 to 10 ton or larger car usually can be saved in less than a year through not only increased output per manshift, as compared with using 2 to 3-ton equipment, but in haulage and maintenance labor and materials."
Excerpt from COAL AGE editorial, May 1945.

— and build them to last with U·S·S Cor-ten

In pointing out the advantages of using large capacity cars, a recent Bureau of Mines report states:—"The time lost per ton due to car changes decreases rapidly as the capacity of the car increases up to 6 tons. It is somewhat less rapid as size increases beyond this figure."

For large capacity cars, U·S·S Cor-Ten High Strength Steel provides the ideal construction. Why? Simply because it permits increases in size with the *least* increase in weight. Because its use insures unusual strength and toughness, provides higher resistance to corrosive conditions, gives maximum ability to withstand hard knocks and abuse.

When you build with U·S·S Cor-Ten you're using steel that has a yield point 1½ times that of structural carbon steel—that has nearly twice the impact strength and greater abrasion resistance—and whose resistance to atmospheric corrosion is 4 to 6 times higher. That's why Cor-Ten has been so successful in prolonging mine car life—in increasing car capacity—and in decreasing weight.

To date, 31,215 mine cars built of U·S·S Cor-Ten are in service in 55 large operations. Though some have been in use for more than ten years, we have no record of a single failure due to wear. The fact that 53% of these cars have been built on repeat orders is, we think, a clear indication that Cor-Ten equipment more than pays for itself even though Cor-Ten construction sometimes costs a little more.

Before you replace worn-out, obsolescent mine cars, find out how to insure top efficiency by building with U·S·S Cor-Ten. We have the facts and will gladly pass them on to you.

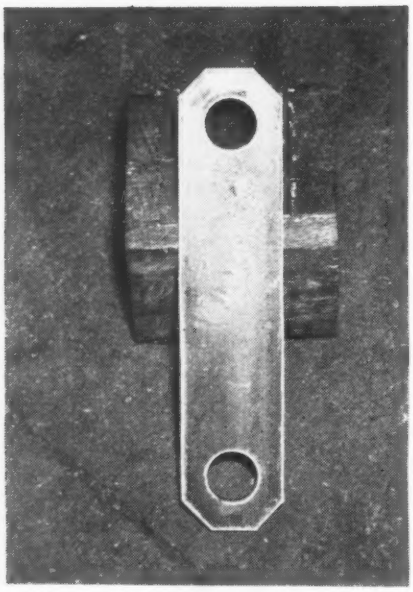
USS HIGH STRENGTH STEEL UNITED STATES STEEL

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago, New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco* NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL Presents The Theatre Guild On The Air Every SUNDAY EVENING AMERICAN Network (Blue)

UNITED STATES STEEL

Cutting Flame Tempers Chain Link

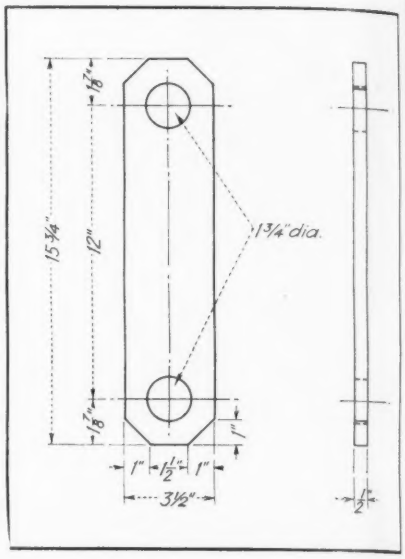


A cutting torch is used to fashion the link from bar steel.

CUTTING LINKS from bar steel with an acetylene torch imparts the correct amount of temper and reduces wear at the pin connections, declares William Baskin, assistant superintendent of the Drifton shop, The Lehigh Valley Coal Co., Drifton, Pa.

The links (some ½ in. thick, others 1 in.) are cut from S.A.E. 1045 carbon steel 3½ in. wide. They are used on drag conveyors in the breakers at the various collieries. The links are first cut to length and then the corners are trimmed, all by cutting torch. The heat from the cut travels in to temper the metal in the end of the link. The result is that after the pin hole is drilled, the outside half of its surface is harder than the inside half.

This tempering effect is not objectionable so far as the drilling of the link is concerned and adds much to the service life of each link. As the driving sprocket pulls the conveyor around, all links are in tension. Therefore, the wear at the pin always is on the half of the hole nearest the end of the link—the portion case-hardened by the action of the cutting flame.



How the link appears before holes are drilled for attaching the flight.

Keeping Transits in the Section Helps

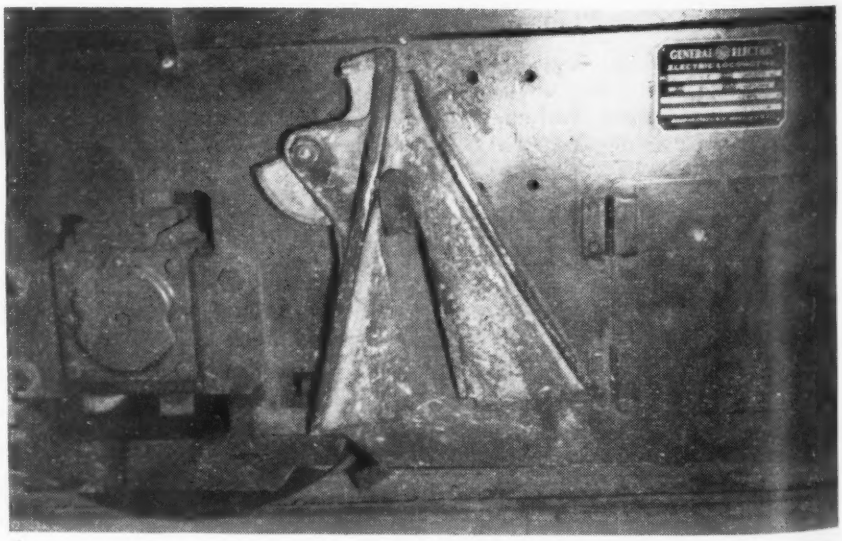
IN ADDITION to their primary duties of underground surveying, the field crew of the engineering department at one mining operation has the job of collecting gas and air samples as well as samples of the mixtures of rock dust and coal dust. When the war pinch for engineers began to be felt, a way was sought to lighten the work of the engineers underground so that they could accomplish more. This was done by arranging to leave a transit in each principal section of the mine for the convenience of the engineers.

Besides saving the men the labor of transporting the instruments in and out of the mine and over the main haulways, this arrangement materially reduces the risk of damage to those instruments. Three transits are left underground, one each near the centers of the working sections. They are stored in locked cabinets heated by lamps. In cold weather there also is the advantage that the instruments do not get cold, thus do not sweat like instruments that have been out in severe cold on the way from the office to the job.

Rerailers Carried on Side of Locomotive

CARRYING RERAILERS on the side of the locomotive instead of on top, declares Haydn Williams, master mechanic at the Stansbury mine, Union Pacific Coal Co., Rock Springs, Wyo., keeps them from damaging the covers of the locomotive.

Rerailers, one of which is shown in the accompanying illustration, often are pitched on top of the rather light-gage covers covering the locomotive, there to ride until they are needed again. This pounding eventually sags the covers. As long as the rerailers are carried on top of the locomotive they must be moved out of the way each time the covers are taken off for motor inspection. At Stansbury all of this trouble is eliminated. Both rerailers are carried on hooks on the same side of the locomotive's frame.

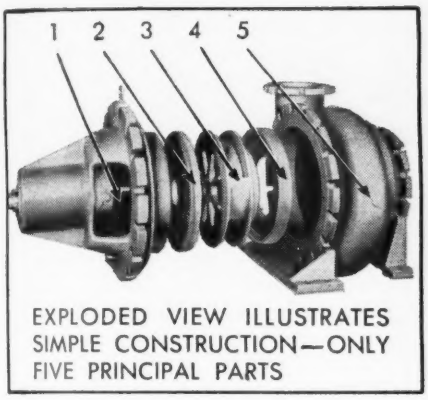


Rerailer carried on hook on the side of the locomotive.

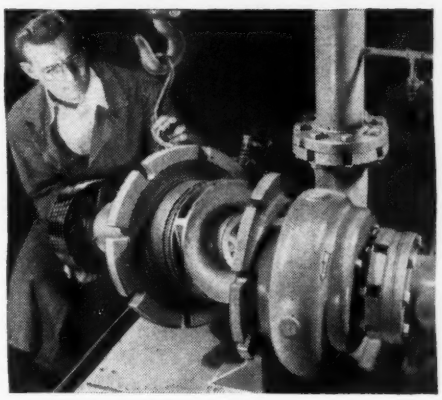
Parts Inventory Cut Much as 2/3

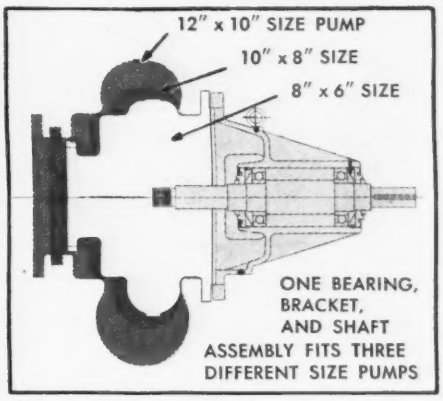
—WITH A-C'S GREAT NEW "SOLIDS-HANDLING" PUMP!

And You Get 2 to 4 Times Longer Life Than With Ordinary Pumps—Materially Reduce Down-Time!



EXPLODED VIEW ILLUSTRATES SIMPLE CONSTRUCTION—ONLY FIVE PRINCIPAL PARTS

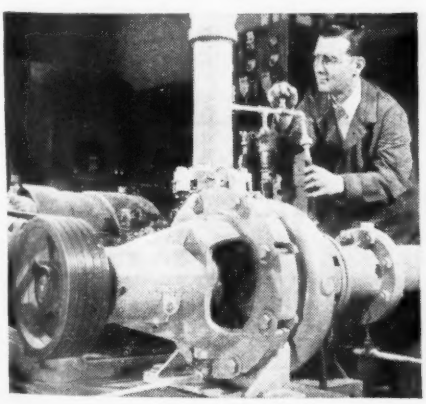


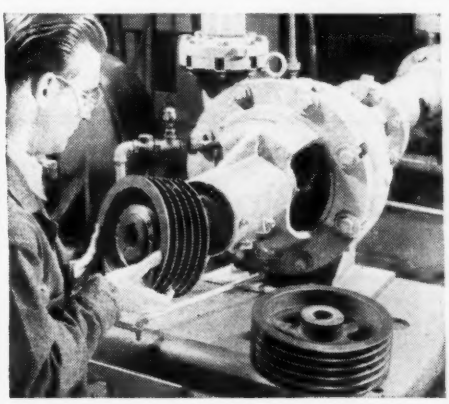


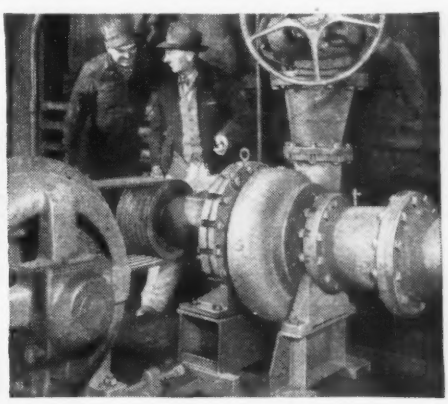
1 Yes, where a *number of comparable* size pumps are used, parts inventory can be cut much as ⅔; and *materially* where 1 or 2 are used! One reason is *simple* design, *fewer* parts. This pump's so designed that . . .

2 You can remove *entire* rotating element without disturbing suction or discharge piping — take apart, re-assemble entire pump fast as ½ hour! And new pumps can *pay off* in parts inventory alone, since . . .

3 Comparable size pumps of different ratings have interchangeable parts. Example: 8 x 6, 10 x 8, 12 x 10 sizes have *same* bearings, bracket, shaft assembly. You stock *1* set of parts for *3* pumps! That's not all . . .







4 These new pumps give you *2 to 4 times longer life* than ordinary pumps! Reasons: *new* design, *special* alloys. What's more, they compare favorably in price with ordinary high efficiency pumps! And *range?*

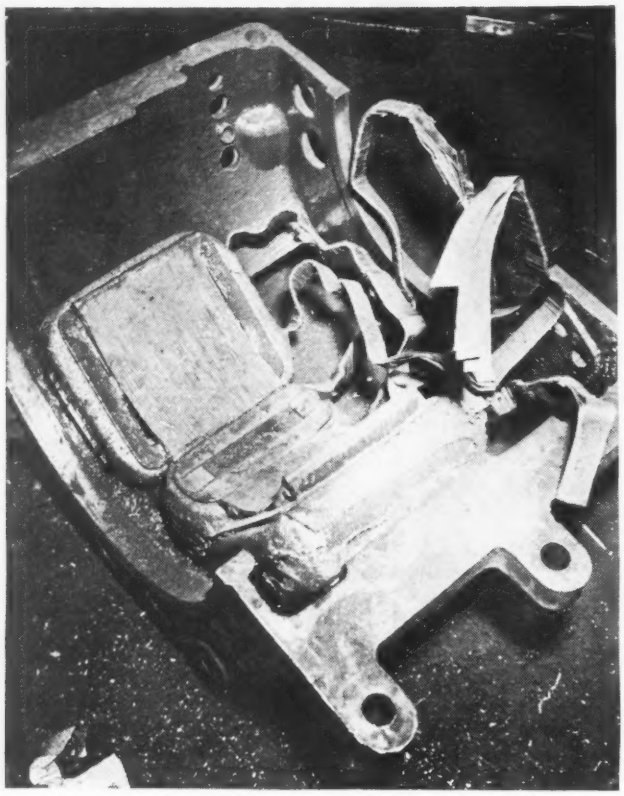
5 You get *wide* capacity range, up or down, *without* touching pump or parts — *not even impeller!* Only change is motor and drive, or drive alone. Yes, it all adds up to: longer life, lower initial cost . . .

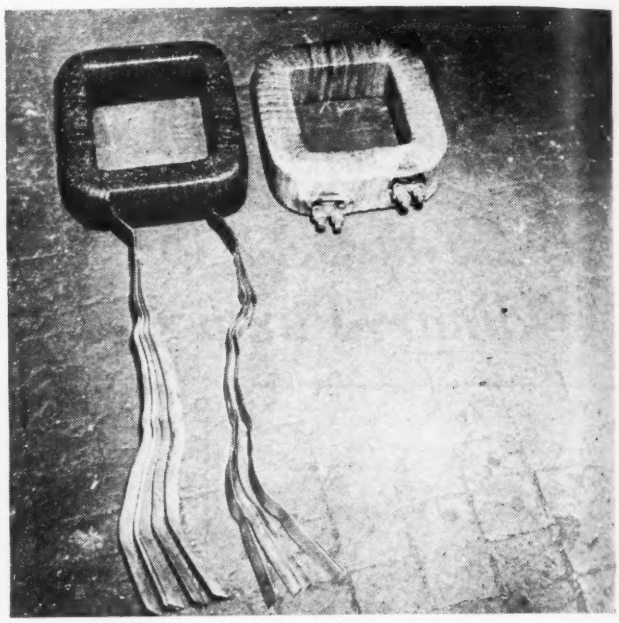
6 . . . lower operating cost, fewer parts — *a new low cost per ton of solids handled!* Here's what one operator reports — "Downtime cut 400%; power savings over $7 a day; parts inventory cut 70%!" A 1913

WANT MORE FACTS? Call this experienced engineer in your nearby A-C district office. Discuss your pumping problem with him. Or, Write direct for Bulletin B6381. ALLIS-CHALMERS, MILWAUKEE, WIS.

ALLIS-CHALMERS
"Solids-Handling" Pumps

Coils With Laminated Terminals Put On Old Motors





New and old field coils.

Frame partly assembled with new ribbon terminal coils.

MANY OF THE IMPROVEMENTS found on modern equipment can be built into old machinery to improve its operation and reduce maintenance cost. The accompanying illustrations show how field-coil terminal connections of old 13-ton locomotives are being brought up to date at one mining operation.

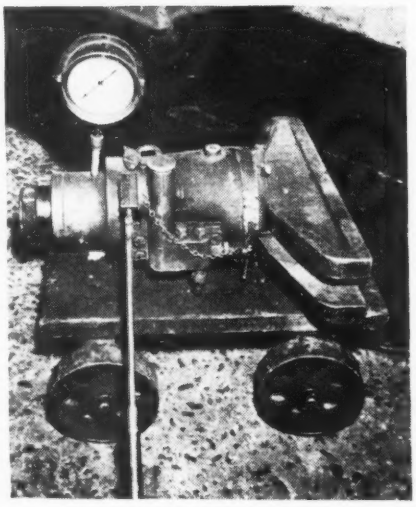
Old and new coils are shown in an accompanying illustration. When vibration, wear and heat loosen the leads as held by setscrews on the old coil (at right) more heat is generated and adds to the heating of the coil, resulting in burned insulation. With the new coil having laminated ribbon terminals there is no connection close to the coil and therefore the reason for heating the coil is eliminated.

In the second illustration, showing a 13-ton field frame with coils partly assembled, two ends of the leads at the top have been interlaced to show the method of bringing them together preparatory to drilling a hole through the laminations and bolting them together. With each lamination touching a lamination of the other lead the joint is easy to maintain without suffering a deterioration that would produce heating.

Hydraulic Ram Plays Big Role in Shops

A HYDRAULIC RAM mounted on a four-wheel truck, reports W. K. Lewis, master mechanic at the Stansbury mine, Union Pacific Coal Co., Rock Springs, Wyo., plays an important role both at the shop and in the field.

The 60-ton-capacity hydraulically operated ram, shown in the accompanying illustration, finds many jobs to do around the shop, such as: hoist shafts, locomotive wheels, armature shafts, etc. This equipment is considered to be so essential that each shop has one.



Each Union Pacific Coal Co. shop has this type of hydraulically-operated ram.

Solutions?

In war, reconversion or peace—it is the solutions to the little troubles that count. Sometimes a simple change makes a machine click—or an idea work. If you have had that experience in connection with a mechanical, electrical, operating or safety idea at your property—won't you tell us about it? If accepted, Coal Age, upon publication, will pay you $5 or more for each.

in mine power service . . .

Hazard WIRE ARMORED cables, designed for suspension in open shafts and in boreholes, are protected by a full layer of galvanized steel wires embedded in asphalted jute. These sturdy wires also provide support for extra long cables hung "by the ears" without intermediate supports or clamps. They are recommended for locations where the greatest protection is required.

Hazard SPIRALWEAVE cables supply power in boreholes and haulage ways. The heavy longitudinal cords of the woven, moisture-proof "fire-hose" jacket act as a tough, abrasion and wear-resistant covering. Spiralweave is recommended for signal and communications circuits, for vertical cables where length or weight is not excessive or for power cables hung overhead in haulage ways or drifts. Hazard Spiralweave coverings are especially treated to resist the destructive action of fungus growths.

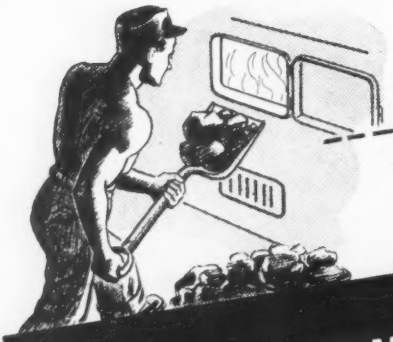
Interior Construction is Identical in Wire Armored and Spiralweave Cables

Conductors have ample thickness of Submarine rubber insulation, whose toughness, resilience, moisture-resistance and non-corrosive qualities assure long life under all conditions. Conductors are individually taped and laid up round with waterproof fillers and covered with a tough rubber jacket . . . ready for the final Steel Armor outer protection, for long lines, or Spiralweave covering for short lines. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

HAZARD

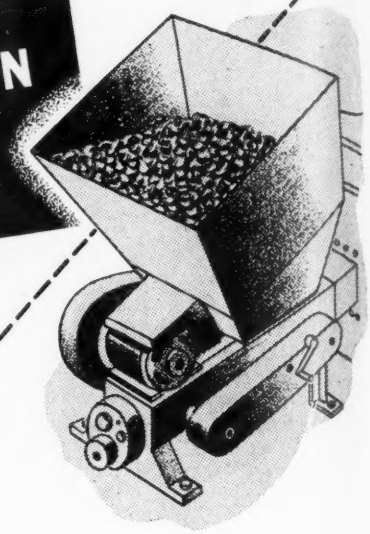
insulated wires and cables for every mining use

4277

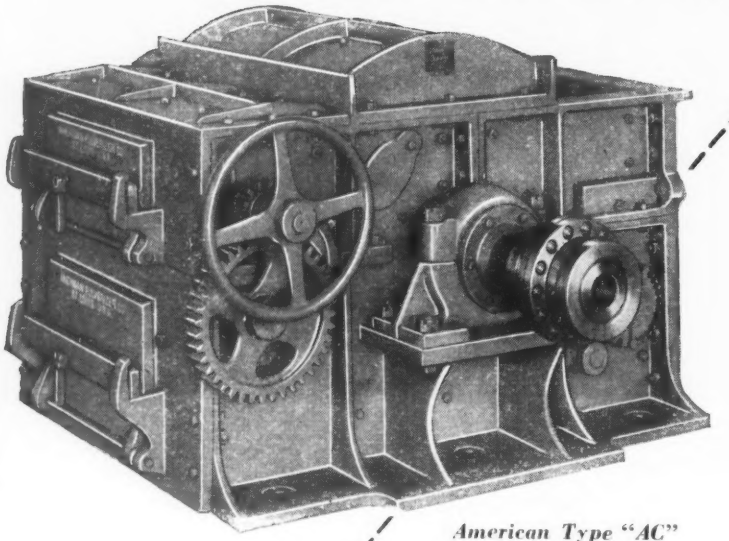


SINCE COAL BURNING IS RAPIDLY CHANGING

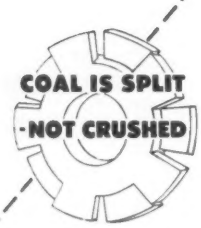
GEAR IN YOUR COAL PREPARATION WITH TODAY'S FIRING DEMANDS



...with AMERICAN ROLLING RING CRUSHERS



American Type "AC" Rolling Ring Crusher



THE SHREDDER RING ACTION —EXCLUSIVE WITH AMERICANS

American Rolling Ring Action employs the required number of manganese shredder rings (each with 20 cutting edges)—revolving freely on their shafts—on the rotor which uses terrific centrifugal force rather than high speeds to split coal instead of crushing it. The shredder rings deflect undamaged from tramp iron—no shear pins or conventional safety devices to bother with.

The sizes in increasing demand—in *all* grades of coal—are stoker and commercial screenings. This means that preparation equipment geared to high lump and egg production must be readjusted to a greater range of reduction to fit the changing demand.

In one step operations, American Rolling Ring Crushers reduce up to 28" ROM—to 1¼"—at capacities up to 500 TPH; to ½" at capacities up to 300 TPH.

In closed circuit operations, proportionately greater capacities are easily attainable in direct ratio to the Americans installed.

Americans *production of uniform sizes,* with no oversize—and a minimum of fines, assures *the quality of product* to meet marketing requirements. This quality is made possible by the Shredder Ring principle—*exclusive with Americans.*

Americans produce the size and quality of coal to meet today's best markets—at a low cost of operation (less than 1¢ per ton)—with high capacities and ease of operation.

Ask any of the many who operate Americans!

Get the facts on low cost, efficient crushing • Send for American's "AC" Bulletin

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

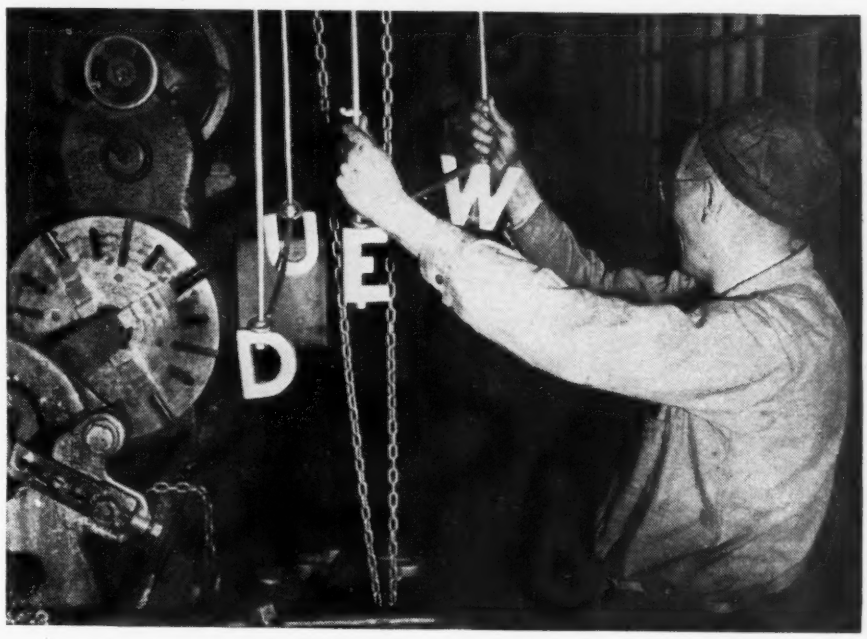
1119 Macklind Avenue
St. Louis 10, Mo.

Labeling Crane Controls Saves Confusion

To ELIMINATE GUESSWORK in crane operation, heavy metallic letters are used to identify the pull-rope controls at the Lehigh Navigation Coal Co.'s Central Repair Shop, Lansford, Pa.

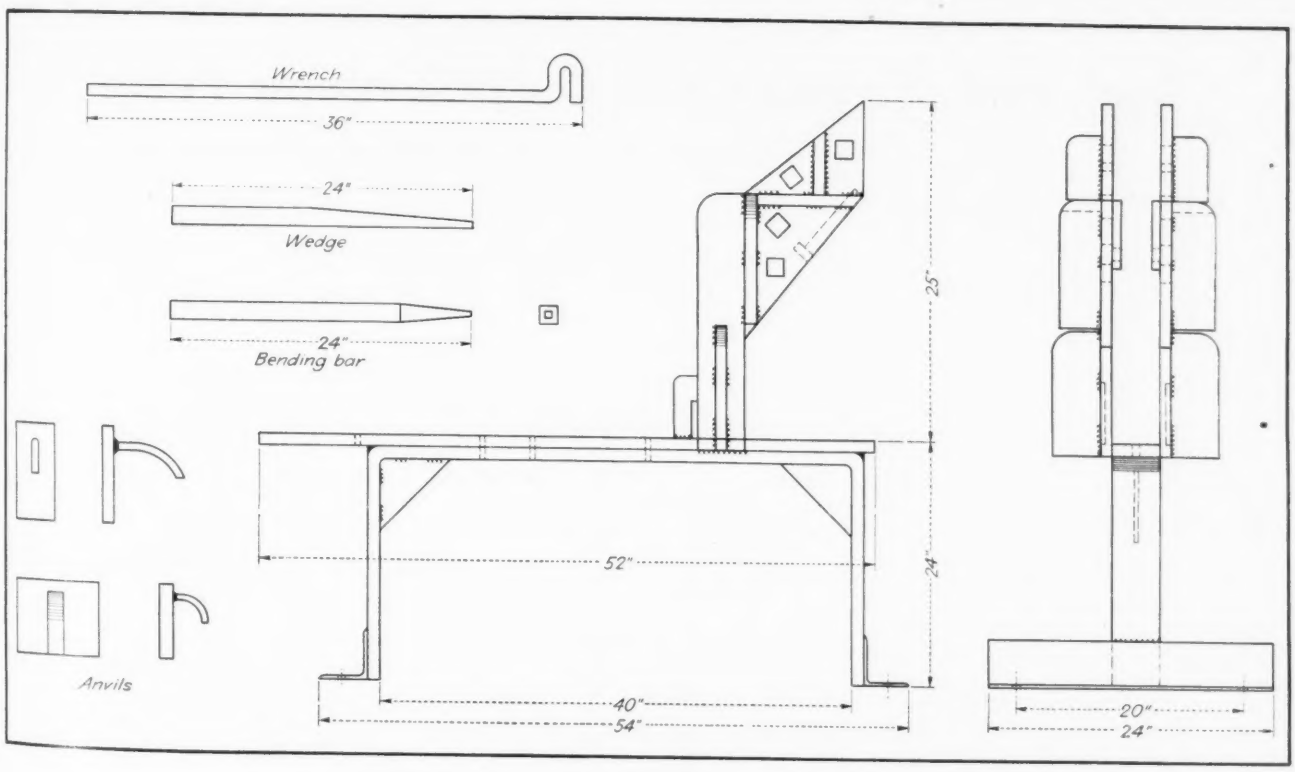
The letters, shown in the accompanying illustration, allow the operator of the 5-ton Niles crane to select quickly the right control each time. The letters *U* and *D*, of course, designate the controls for moving the hook either up or down; while the letters *E* and *W* label the controls for shifting the crane to the East or West along the crane bay. Crosswise movement of the carriage is done manually through the endless chain.

Similar controls are linked together with loosely fitted rods. This avoids having to untwist and straighten out the ropes each time the crane is used.



Metallic letters clearly mark the crane's controls.

Car Bale Jig Saves Time and Promotes Accuracy



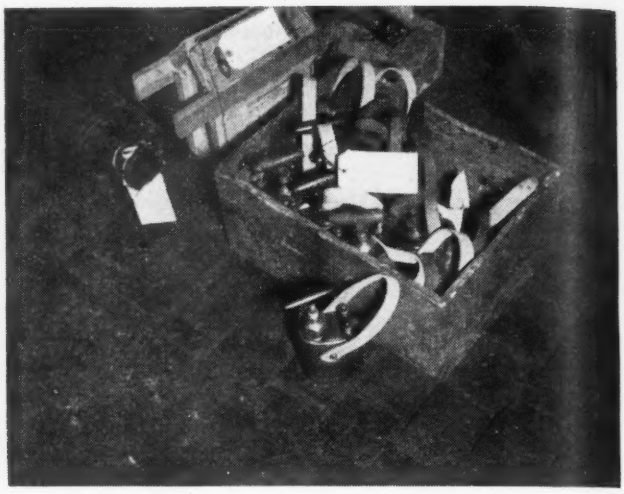
Jig frame, wrench, wedges and anvils for bending car bales.

ONE MAN CAN BEND a bale or band for a wooden mine car in 30 minutes instead of two men working 70 minutes, by using a special jig and anvils built by Sam Rice, blacksmith at Somers mine of the Pittsburgh Coal Co., Pricedale, Pa. With the jig, accuracy is assured without a ruler.

As indicated in the drawing, the jig consists of a 1x4-in. bedplate 52 in. long mounted with its top 24 in. above the bottom of the base, and at one end carrying a welded structure shaped as a jig to bring the ends of the bale to correct shape by use of the wedges, the special wrench, special anvils and a hammer.

Blasting Machines Repaired Periodically

Each blasting machine is completely torn down and the worn parts are replaced.



A group of reconditioned blasting machines are ready to be returned to No. 10 Lamp Station at Greenwood colliery.

AN ATTEMPT IS MADE to overhaul each blasting machine used at the collieries of the Lehigh Navigation Coal Co. once every six months. Out of 1,200 machines (all types) used during 1944, repairs were made to 1,698 units in the electrical department of the Central Repair Shop, Lansford, Pa.

The units, shown in the accompanying illustrations, are torn down and completely rebuilt—not merely fixed. Most units get new leather carrying straps, a small but nevertheless an extremely important item when it comes to the handling of these devices.

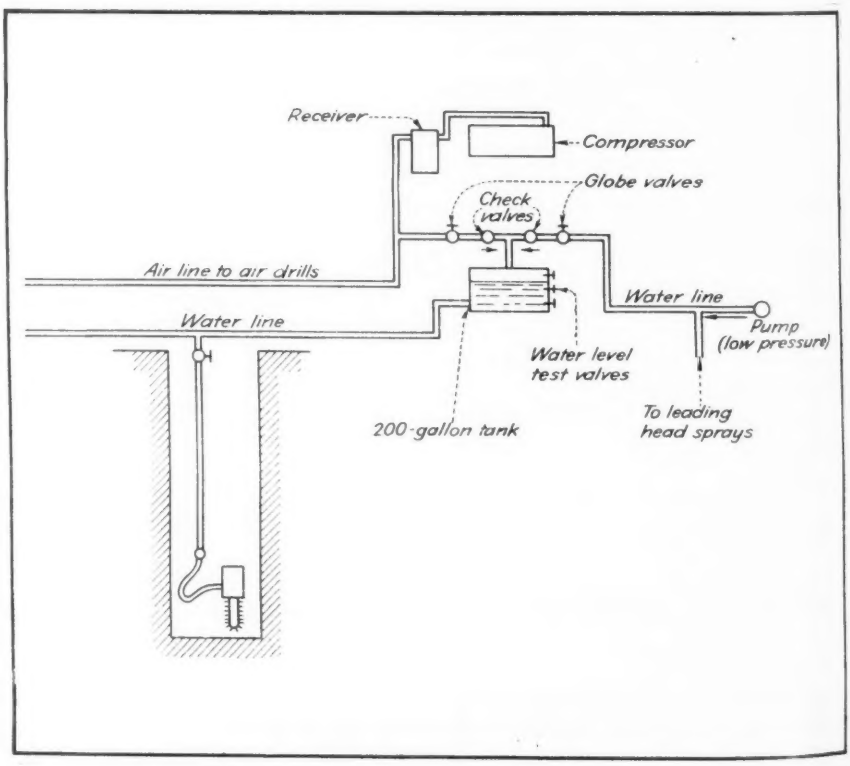
Among the types of blasting machines repaired are: Midget firing battery (2-shot); Atlas No. 2 (10-shot); Davis No. 1 (5-shot); Davis No. 2 (10-shot); Fidelity-Atlas (10-shot); and the Push Type (1 to 50).

The cost per unit, when 1,698 units of all types were repaired in 1944, was $3.93 (including labor and materials).

Rock Drill, Air and Small Tank Eliminate Pump

AN EMERGENCY METHOD for supplying water under pressure to the cutter bars in a conveyor section of Montour No. 10 mine of the Pittsburgh Coal Co., Library, Pa., proved practically as good as the original. This method, indicated in the drawing, was proposed and installed by Robert Messner, mechanic, when a high-pressure spray pump failed and there was no spare available.

Air-operated rock drills and an air compressor are necessary in the section; therefore the normal air pressure is utilized to boost the water pressure. Substitute equipment consisted of a 200-gal. pressure tank, three water-level test valves, two check valves and two globe valves. Normal pressure of the water-supply line is sufficient for the loading-head spray but not great enough to force the water the additional distance through relatively small piping to the heading and room faces. The car trimmer at the loading point has the duty of keeping the tank filled with water, which is done by checking with the test valves and manipulating the globe valves. The use of check valves, the piping arrangement and the fact that the air pressure is greater than the pressure of the water supply keeps water from getting into the airlines.



Air pressure instead of a pump now forces water to the spray heads on cutting machines in conveyor sections.

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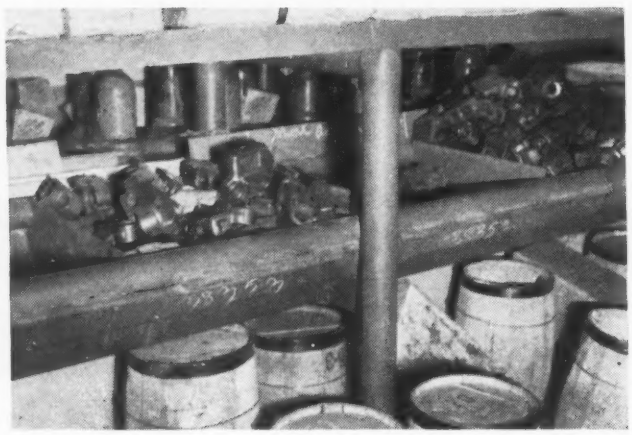
Worn Pans Make Good Bins



Shaker pan with partitions and reinforced with pipes makes sturdy bins.

Shaker pans without partitions make good racks.

AFTER SHAKER PANS have served their time underground, says Matt Morrow, storekeeper at D. O. Clark mine, Union Pacific Coal Co., Superior, Wyo., they can be made into bins for accommodating parts and materials in the storeroom.

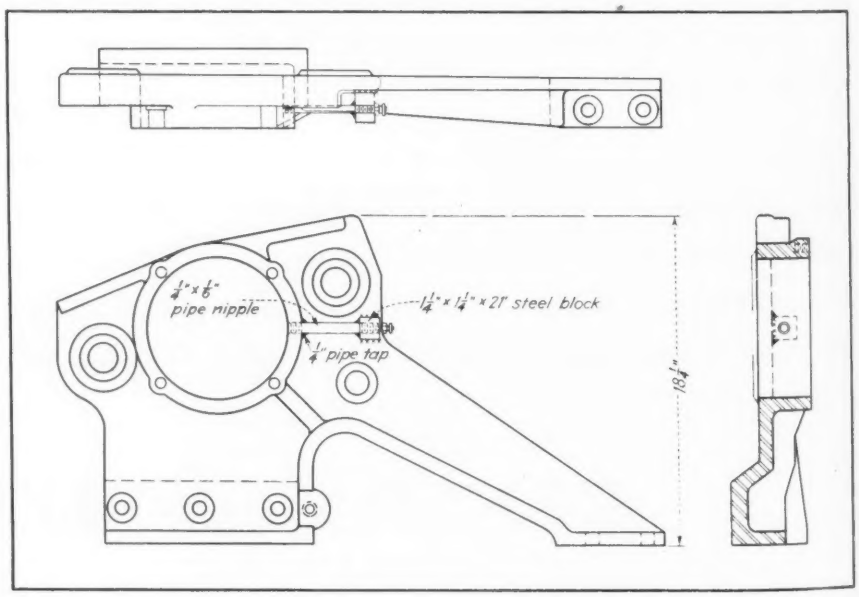
Bins made from pans, shown in the accompanying illustrations, serve as excellent racks for drill augers and threadbars. Pipes welded along the top edge of each side of the pan provide reinforcement for carrying the ordinary bin loads. Partitions can be used to divide the bin into sections suitable for storing chain lugs or almost any of the other supply items. The rounded corners of the pan are helpful when the bin is being cleaned at the necessary intervals.

Loader Greasing Changed by Moving Fittings

MOVING THE GREASE FITTING to a more convenient spot helped to eliminate dryness of bearings on the pedestals of Joy 7BU loading machines at Banning No. 1 mine of the Pittsburgh Coal Co., Van Meter, Pa. This improvement, made by John Narbut, master mechanic of that mine, is shown in the accompanying illustration.

Whereas the fitting originally was in a place hidden and difficult to reach with the grease gun, it is now out in the open. The ¼x6-in. pipe extension is protected at the end by a block of steel welded to the pedestal and the grease fitting is screwed into this block.

The change eliminated the tendency to let greasing of that particular spot go until "tomorrow." The disadvantage of having any greasing point hidden and difficult to reach is emphasized by the experiences of many motorists who trust garages and commercial greasing stations to do good jobs on their cars. Very often a repairman, the car owner, or an exceptionally conscientious greaser discovers that a bearing appears not to have been greased since the car left the factory. On certain cars the bearings of the knee action, tucked away up under the front fender, are a conspicuous example of the neglect.



Short length of pipe and welded terminal block bring fitting to light.

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GIVE YOUR MEN TROUBLE FREE

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CHAINS, BITS AND CUTTER BARS...

CINCINNATI DUPLEX CHAIN

DON'T get yourself in the dog house with your men. Make their job easier and you'll make your own easier . . . give them trouble free, Cincinnati Duplex Chains, reversible, double ended Bits and sturdy Cutter Bars. Machine operators are better satisfied . . . you get greater production, and larger cuttings. Cincinnati Chains and Bits are easy to service . . . maintenance time is cut to the bone and everybody's happy, including the boss. Save man hours . . . save power . . . decrease cutting costs with Cincinnati Time Tested Coal Cutting Equipment.

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News Round-Up

Lewis Calls Off Supervisory Strike Until "More Appropriate Date"

AFTER CONFERENCES with operators extending over nearly three weeks that developed little of a constructive nature but became so bitter at times that fisticuffs seemed imminent, John L. Lewis, United Mine Workers' president, unexpectedly called off the coal strike Oct. 17, postponing but not abandoning further efforts to gain recognition for the United Clerical, Technical and Supervisory Employees, affiliated with District 50 of the union. Evidently miffed at the government for failing to bring about an outcome acceptable to the miners, a union spokesman said: "Obviously the government has failed to settle the matter; obviously the action was taken in the public interest."

The stoppage, which began Sept. 21, spread to 210,000 bituminous miners, causing a loss of more than half of the national daily tonnage in the last days of the walkout. The total tonnage loss was estimated by the Solid Fuels Administration at more than 13,000,000 tons.

Cessation of the strike came with the dispatch of a telegram signed by Mr. Lewis, John O'Leary, union vice president, and Thomas Kennedy, secretary-treasurer, to local unions and addressed to all members of locals in districts affected by the stoppage. The message said that negotiations over the status of supervisory workers "have been discontinued" and that "future efforts to abate this controversy will be resumed at a later more appropriate date."

The telegram added:

"All mines now idle will resume production Monday, Oct. 22. Company men and cutting crews will start to work at any necessary time in advance. The officers of the United Clerical, Technical and Supervisory Employees of the Mining Industry are issuing similar instructions to their own membership, so that the mines will be properly examined and made safe before entry by mineworkers. Each member of the United Mine Workers is requested to cooperate fully with this policy.

"Any attempt by individual coal companies to assess and collect fines, discharge employees, impose hardship of demotion, or in any other manner harass our members for participation in the present stoppage should be promptly reported by the local union affected to the district officers. District officers will then promptly file 30-day notices of strike vote with the National Labor Relations Board, under the provisions of the infamous Smith-Connally slave law.

"District officers and all authorized field representatives are instructed to cooperate effectively in the execution of this policy."

On the same day, the National Bituminous Coal Operators' Negotiating Committee issued a statement that it was "pleased at the turn of events that has restored the coal mines of the nation to operation in this critical time under the terms of their contract with the United Mine Workers of America.

"We will not, as consistently indicated," said the statement, "assess or collect penalties from the strikers despite the fact that we are under contract with the United Mine Workers of America to do so. We will cooperate to the fullest extent with the government and our employees to the end that the public interest is adequately and properly served."

Incidentally one of the reputed authors of the Smith-Connally "anti-strike" Act, Representative Howard W. Smith (D., Va.), asked the House Military Affairs Committee Oct. 17 to recommend repeal of this wartime legislation. He denied that it was any child of his. John M. Houston, member of NLRB, which handles the taking of strike votes under the law, appealed to the committee to repeal at least the section putting this "intolerable burden" upon his agency. The committee, which seemed generally inclined to approve repeal, put off decision, however, until after it heard from the Department of Labor. The latter also urged repeal.

The outlook for an early agreement on

"Jensen, I want you to meet Mr. Frapwell. Mr. Frapwell wrote a book you ought to read, called "How to Mine Coal."

the supervisory issue had dimmed considerably by Oct. 11, when the operators and union representatives seemed as far apart as ever on the points at issue. This despite the warning of Secretary Ickes that Europe was desperately dependent on us for a bare minimum of heat and power during the coming winter. After conferring with President Truman, Secretary Schwellenbach said the Chief Executive was anxious for an early settlement.

It was on Oct. 12 that the coolness between the operators and union officers became even more marked and Mr. Lewis and former Senator Edward R. Burke, president of the Southern Coal Producers' Association, after several bitter exchanges, seemed on the verge of coming to blows. When the following three days proved equally barren of result Secretary Schwellenbach called off the conferences.

The Secretary of Labor said he had done this after the operators rejected five separate proposals for settlement. He added, however, that government seizure of idle mines was not in prospect. If he happened to think of another proposal to offer he said he would ask the parties to convene again.

Mr. Lewis declared:

"We are locked out. The United Mine Workers have accepted every suggestion of the Secretary of Labor. The miners are idle because of the obstinacy of the operators. The U.M.W. offered to go back to work if the operators would negotiate the issues, but the operators declined."

Mr. Schwellenbach said the government would not consider seizure of the struck mines "as long as the negotiations are adjourned only subject to call." But he added: "I am not going to call them together again to resume discussions until there are indications that resumption will be worth while."

Two test actions were begun Oct. 15 that were expected to determine whether the strikers would be paid while idle or fined. At Harrisburg, Pa., the Unemployment Compensation Board of Review revealed that twelve bituminous miners had filed appeals from a State ruling denying them compensation until after a waiting period of five weeks.

At Bridgeport, Ohio, the Ohio Coal Association notified U.M.W. officials that the work stoppage was "illegal." Therefore, the association asserted, the operators will "impose the customary fine of $1 for each day the miners are absent from work."

U.M.W. representatives in the Clearfield, Greensburg, Uniontown and Pittsburgh areas said they would appear in Harrisburg, Pa. to refute the bureau ruling that the union is involved in an industrial dispute.

It seemed probable on Oct. 23 that Paul M. Herzog, NLRB chairman, would be called on to cast the deciding vote on the petition filed with the board by U.C.T.S.E.U. requesting certification as representing supervisors in the coal mines of the Jones & Laughlin Steel Corp. John M. Houston, board member, leaned toward granting the petition, whereas Gerard Reilly, another member of the board, was against it.

Counsel for the supervisors' union, Samuel Kimsly, argued that supervisors were "employees" as defined under the National Labor Relations Act and formed a proper unit for collective bargaining. He added that for the most part firebosses and supervisors had no right to hire and fire or to formulate policy, safety rules or regulations. As the supervisors came up from the ranks, he said, all of them had been U.M.W. members.

When Chairman Herzog recalled that the company feared that the supervisors' union and the production workers' union, joined together, might have an adverse effect on management the union attorney retorted that the 10 percent of the supervisors could not be "the tail that wags the dog." Mr. Kimsly said that supervisors had virtually been forced to form a union for self-protection when wages of the men they supervised began exceeding their own.

John C. Bane Jr., legal representative for the steel company, denied that the supervisors' union had an independent existence. He contended that it was hardly more than a name and that it was controlled by U.M.W. He recalled that John L. Lewis had exempted foremen and supervisors from agreements covering rank and file workers. The agreements, he added, prevented U.M.W. from expanding its jurisdiction to take in the supervisory employees.

The supervisors, said Mr. Bane, are not traffic cops, as alleged by the union, but indispensable agents of the company's management, having power and responsibility to represent its interests in its dealings with rank and file miners. Certification of the supervisors, he continued, would hamper the company's methods of controlling and managing its coal properties so as to constitute infringement of the rights and liberties guaranteed by the First and Fifth amendments to the Constitution.

Supervisory employees as well as mine workers in the Pittsburgh area started back to work Oct. 18, four days before the time set by Mr. Lewis. According to SFA, production was resumed on that day in twelve mines in the Pittsburgh district. Work was being resumed slowly also in West Virginia and other areas. Reports from the field on the morning of Oct. 26 indicated that the mines where strikes by the rank and file of U.M.W. were continuing numbered less than 20. Reports also revealed that there had been no let-up in the campaign of intimidation and terrorism to browbeat foremen into joining the U.M.W. branch union of supervisory employees.

It was reported that at one mine the rank and file now refused to ride in the cage with the mine boss, that in another the miners served notice that after Oct. 27 they would not work unless all the supervisory personnel had signed union cards, that mines in Tennessee were being visited by teams of union agents who put the mine bosses and white collar workers on the spot with the threat that if they did not sign the union card they would be out of the mine and off the property in another week or two.

COAL ACTIVITY

Bituminous Coal Stocks

	Thousands Net Tons Sept. 1 1945	—P.c. Change— From Aug. 1 1945	From Sept. 1 1944
Electric power utilities	14,690	+2.9	−15.6
Byproduct coke ovens	4,503	−5.3	−24.0
Steel and rolling mills	680	+3.7	−12.3
Railroads (Class I)	10,387	+1.6	−29.0
Other industrials*	15,706	+4.0	−19.0
Total	45,966	+2.1	−20.9

Bituminous Coal Consumption

	Thousands Net Tons Aug. 1945	—P.c. Change— From July 1945	From Aug. 1944
Electric power utilities	6,026	−0.6	−14.4
Byproduct coke ovens	7,181	−6.7	−10.0
Steel and rolling mills	696	−6.8	−16.2
Railroads (Class I)	9,728	−3.3	−6.8
Other industrials*	9,944	−0.5	−6.7
Total	33,575	−2.8	−9.1

* Includes beehive coke ovens, manufactured-gas plants and cement mills.

Bituminous Production

September, 1945, net tons	46,330,000
P.c. change from September, 1944	−7.3
January–September, 1945, net tons	437,838,000
P.c. change from Jan.–Sept., 1944	−7.7

Anthracite Production

September, 1945, net tons	4,613,000
P.c. change from September, 1944	−15.2
January–September, 1945, net tons	40,834,000
P.c. change from Jan.–Sept., 1944	−17.0

Sales, Domestic Stokers Vs. Oil Burners

	Stokers	Burners
August, 1945	10,543	10,419
P.c. change from Aug., 1944	+144.6	+335.6
January–August, 1945	57,307	46,248
P.c. change from Jan.–Aug., 1944	+187.9	+146.1

Index of Business Activity*

Week ended Oct. 27	148.5
Month earlier	158.7
Year earlier	231.1

* *Business Week*, Nov. 3.

Electric Power Output†

Week ended Oct. 27, kw.-hr.	3,937,420,000
P.c. change from month earlier	−2.5
P.c. change from year earlier	−9.7

† Edison Electric Institute.

Coal Situation Eases; Controls Lifted

Solid Fuels Administrator Harold L. Ickes declared Oct. 24 that there should be enough coal to go around this winter even though some consumers may not be able to get their favorite ashless, smokeless variety. His reassurance was included in an announcement that SFA was relaxing most of its wartime controls over anthracite and coke shipments by producers, wholesalers and retailers, effective Nov. 1. He added, however, that the government would retain its right to divert emergency shipments of anthracite to critical areas if the need should arise.

Four days earlier, Great Lakes fleet operators said this season's deficit will aggregate 4,000,000 tons despite Mr. Ickes' plea to shippers and vessel men to accelerate shipments of bituminous coal to Lake Michigan and Lake Superior ports. Because of a late start and lack of tonnage early in the season, the coal movement dropped 2,000,000 tons behind schedule

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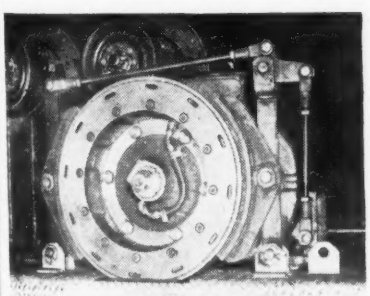
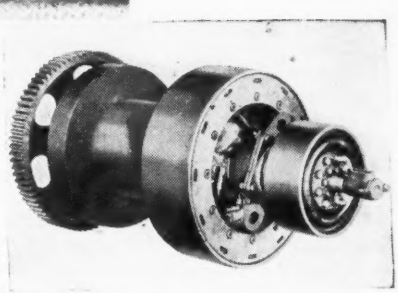
The newest improved type of shovel is Fawick equipped—for more dependable, more economical operation.

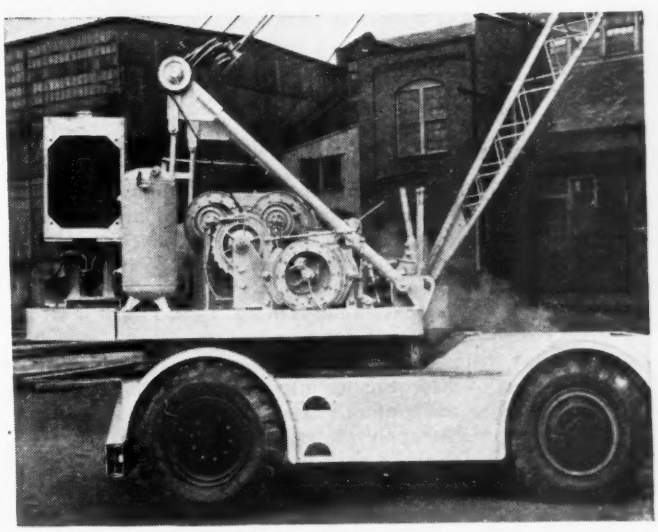
Fawick Clutches are providing new efficiency for shovels, cranes, draglines and hoists.



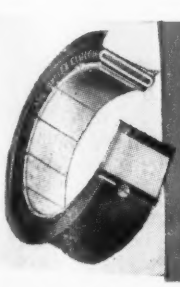
Main propel mechanism of the Shovel above—Fawick equipped.



Hoist drum assembly of the Shovel above—Fawick equipped.



Seven Fawick Clutches are used on the new Byers ½ cu. yd. "Traveler".



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in the spring and summer months, and the recent mine strike shaved another 3,000,000 tons off lake shipments, according to vessel operators.

Questioned as to whether he expected that it would be necessary to ration coal for domestic heating, Mr. Ickes said Oct. 11, soon after a month's absence in London: "We have no plans to ration coal. If the situation becomes worse, the best way to control distribution of coal would be through the retail outlets, as we have done in the past. But I don't anticipate that it will be necessary. Coal shipments to Europe will not be seriously affected by the strikes because the government is sending coal abroad that cannot be very well used in this country."

In a statement issued Oct. 18 SFAW approved the export of strip and lower grade bituminous coal produced in northern West Virginia, Pennsylvania, Alabama and some coal in surplus supply in Oklahoma, New Mexico and west Kentucky. Substantially all of such coal is mine-run.

Another statement Oct. 18 by SFAW provided that shippers of coal produced in Districts 1 to 4 and 6 to 8 as well as some dock operators who have surplus coal after meeting all orders required or permitted are directed to report such surplus tonnage to the Area Distribution Manager, the latter being authorized to permit the distribution of such surplus to consumers even though they have 45 days' or more supply of coal. The Area Distribution Manager, however, is authorized to relax the prohibition on shipments to consumers with 45 days' or more supply in cases where application of the rule would work extreme hardship.

A third SFAW statement issued Oct. 18 clarifies the schedule of preferences to be accorded bituminous shipments pursuant to SFAW Regulation 27 as amended. The statement sets up four preferences.

OPA moved Oct. 19 to prevent price ceilings from impeding shipments of bituminous coal by truck from mines generally shipping by rail to areas where local shortages have developed. Acting on a request from SFAW, OPA said the agency may, on application, issue an order to any rail-connected bituminous mine raising its price ceilings for truck-shipped coal where it appears that:

(1) Due to inadequacy of truck-loading facilities, there exists or threatens to exist a shortage in the supply of truck coal in the area in which the mine is located, and (2) more extensive use of existing truck-loading facilities or construction of new facilities would substantially reduce or eliminate such shortage.

Basing its action on the short supply of byproduct coal, WPB issued an order Oct. 10 to gas manufacturers requiring them to put into maximum operation at once all facilities for producing water gas or gas manufactured from oil and coke. Order U-10, furthermore, calls for the full use of other fuels whenever standby facilities are available to consumers of manufactured gas. Concurrently WPB issued Direction 4 to PR-32 to prevent excessive inventories of coke as the short supply of coal also was causing a loss of coke production. Industrial users, including utilities, are restricted to a 20-day supply of all coke.

In extending emergency controls to coals mined in central Pennsylvania, thus including all the strike-bound Appalachian region, Deputy Solid Fuels Administrator C. J. Potter on Oct. 5 urged all consumers rigidly to conserve coal, coke and manufactured gas. He appealed to retail dealers to place their deliveries on an emergency basis voluntarily whenever conditions warranted such action, stating that further general shrinkage of the solid-fuel supply probably would make it necessary for SFAW to place blanket controls on local deliveries to protect the public against emergencies.

Emergency regulations issued at the beginning of the strike of supervisory men and miners who walked out in sympathy were rescinded by SFAW Oct. 17 in the following notice of direction:

"1. The general emergency directions listed below are hereby revoked:

"Notice of Direction to Person Shipping Coal Produced in Districts Nos. 2, 3, 6 and 8 prohibiting export movement, issued Oct. 2, 1945 (10 F.R. 12481).

"Notice of Direction to Coal Producers in Districts Nos. 2, 3, 6 and 8, prohibiting shipments except to certain classes of persons referred to in Statement Concerning Direction Sent to Certain Producers in Districts Nos. 2, 3, 6 and 8, issued Oct. 2, 1945 (10 F.R. 12481).

"Notice of Direction to Certain Producers in District No. 4, prohibiting shipments except to certain classes of persons referred to in Statement Concerning Direction Sent to Certain Producers in District No. 4, issued Oct. 3, 1945 (10 F.R. 12549).

"Notice of Direction to Persons Shipping Coal Produced in District No. 7, prohibiting export movement, issued Oct. 3, 1945 (10 F.R. 12550).

"Notice of Direction to Coal Producers in District No. 7, prohibiting shipments except to certain classes of persons referred to in Statement Concerning Direction Sent to Certain Producers in District No. 7, issued Oct. 3, 1945 (10 F.R. 12550).

"Notice of Direction to Persons Shipping Coal in District No. 1, prohibiting export movement, issued Oct. 4, 1945 (10 F.R. 12627).

"Notice of Direction to Coal Producers in District No. 1, prohibiting shipments except to certain classes of persons referred to in Statement Concerning Direction Sent to Certain Producers in District No. 1, issued Oct. 5, 1945 (10 F.R. 12627).

"Notice of Direction to Commercial Dock Operators on the Great Lakes, Tidewater and River, prohibiting shipments except to certain classes of persons referred to in Statement Concerning Direction Sent to Commercial Dock Operators on the Great Lakes, Tidewater and River, issued Oct. 5, 1945 (10 F.R. 12627).

"2. Effective immediately, and until further notice, all persons shipping bituminous coal produced in Districts 1-4 inclusive and 6-8 inclusive and all commercial dock operators except commercial dock operators located on the Great Lakes, are prohibited from shipping during any calendar month any bituminous coal to any industrial consumer whose days' supply of coal, as of the last day of the preceding month, was 45 days or more, as shown by information in the order, or confirmation of the order, furnished pursuant to Section 602.712 of SFAW Regulation No. 27, for recording by the producer on Form SFA No. 79. In the absence of such data, the shipper may use other reliable evidence of an industrial consumer's days' supply.

"3. The provisions of this Notice of Direction do not relieve shippers and industrial consumers from complying with the provisions of SFAW Regulation No. 27, as amended, and with the provisions of all other outstanding directions including those contained therein.

"4. The provision of this Notice of Direction do not relieve shippers of coal from complying with the provisions of the Notice of Direction to Shippers of Coal Produced in Districts Nos. 2, 7 or 8 Moving Via the Great Lakes, issued Sept. 14, 1945 (10 F.R. 11884) and Notice of Direction to Shippers of Coal Produced in Districts 1, 3, 4 or 6 Moving Via the Great Lakes, issued Oct. 15, 1945 (10 F.R. 12898). As indicated in the Statement Concerning Necessity of Continuing in Effect SFAW Regulation No. 27, issued Oct. 2, 1945 (10 F.R. 12481), the brevity of the remaining period of lake navigation makes it imperative that obligations of shippers to furnish coal moving via the Great Lakes be met with the utmost dispatch.

"5. This Notice of Direction does not effect civil or criminal liabilities resulting from violations of any directions revoked herein."

Mr. Ickes announced the closing of SFAW field offices in Denver, Kansas City (Mo.), Salt Lake City, Seattle and Des Moines on Oct. 31. Their closing, he said, is warranted by the adequacy of the overall supply of solid fuels in the affected area. Field offices in St. Louis and Minneapolis will be retained. All matters formerly handled by the offices just closed are to be referred to Deputy Administrator Potter in Washington.

SFAW in Order No. 29 called upon each producer and each wholesaler of Pennsylvania anthracite to file with SFAW on or before Nov. 10 and the tenth day of each month thereafter to and including April 10, 1946, the following:

"A report in writing on a report prescribed by SFAW indicating (1) the actual tonnage of anthracite produced, pre-

MEETINGS

- **Harlan County Coal Operators' Association: annual meeting, Nov. 21, Harlan, Ky.**
- **Coal Mining Institute of America: annual meeting, Dec. 6 and 7, Fort Pitt Hotel, Pittsburgh, Pa.**
- **Kentucky Mining Institute: annual meeting, Dec. 7 and 8, Lafayette Hotel, Lexington, Ky.**

For Better Coal Prices

TOMORROW

see Morrow Engineers

TODAY

Morrow is ready now—to design and build efficient preparation plants for clean coals—to help you win the better post-war markets and the higher prices.

Morrow mechanization raises product value, reduces costs, cuts labor and waste, speeds production—*thus widens the spread between cost and sales price.*

That's why Morrow Tipples are found at a large percentage of all mechanized mines. And that's why it will pay you to call on Morrow engineers *now* to help you get better preparation tomorrow.

Ask Morrow to assign an engineer to study your situation. Write The Morrow Manufacturing Company, 1949 Ford Blvd., Wellston, Ohio. *Division The Wacker Corporation.*

Better Preparation
= *INCREASED SALES!*

1. low impurity content
2. correct sizing
3. high uniformity

MECHANIZE WITH MORROW

COAL WASHERS • WEIGH PANS • FEEDERS • DUMPS
BINS AND BIN GATES • FLANGED LIP SCREENS
CONVEYORS • LOADING BOOMS • SHAKING SCREENS
VIBRATING SCREENS • CAR HAULS • PICKING TABLES
SETTLING TANKS • ELEVATORS • CAR RETARDERS
PERFORATED METAL SCREENS • STEEL STRUCTURES

pared or purchased, and the actual tonnage shipped during the preceding full calendar month, and (2) the actual tonnage of anthracite produced, prepared or purchased and the actual tonnage shipped, shown cumulatively from April 1, 1945, to the end of that same calendar month."

The order became effective Nov. 1.

In addition, SFAW Order No. 30 continues the National and Regional Anthracite Distribution Committees and their functions. Appointments of persons now serving as members of these committees are to continue in effect.

•

Cut Anthracite Rates To Tidewater

A reduction of 25c. a ton in rail rates on anthracite shipped from the Wyoming, Lehigh and Schuylkill areas of Pennsylvania to tidewater piers in New Jersey was ordered Oct. 23 by the Interstate Commerce Commission, effective next Jan. 22. These maximum rates were set:

To the piers at Edgewater, Weehawken, Hoboken and Jersey City (upper piers), $2.25 per gross ton on prepared sizes and 2.13 on pea and smaller sizes.

To the piers at Elizabethport, Port Reading, Perth Amboy and South Amboy (lower piers), $2.20 per gross ton on prepared sizes and $2.08 on pea and smaller sizes.

Present rates to the upper piers are $2.50 a ton on prepared sizes and $2.38 on pea and smaller; to the lower piers, 5c. lower than to the upper piers.

•

Pierce to Undertake China Mining Mission

Preparatory to taking up the task of rehabilitating and reequipping the mining industry of China, James H. Pierce, Pennsylvania anthracite operator and consulting engineer, is scheduled to leave this country around Nov. 1. He will go by air. Principally to size up the mining industry from an organizational standpoint, said Mr. Pierce, the trip will take from eight to ten weeks. Further plans, he said, as to sending organizational personnel to China are dependent on the survey to be conducted.

The survey is to be centered on anthracite and bituminous mines in Manchuria and northern China. Mr. Pierce and company plan to spend one week in Chungking, then proceed to Mukden, Manchuria, and continue their investigation through northern and southern China. J. W. Woomer, Wheeling, W. Va.; Fred Koper, New York, and Lucian Eaton, Boston, are to accompany Mr. Pierce.

Mr. Pierce was designated as consultant by the National Resources Commission of China on July 5 and for several weeks conferred with representatives of the Chinese Government who came to Scranton, Pa., to consult him. He was asked to begin the complex job of preparing the mines in China for early production as soon as hostilities ceased. The rehabilitation job later is to include metal mining. Mr. Pierce and his associates have handled consultant and management work in 14 foreign countries including Russia, Canada, England, Germany, France and South American republics.

•

Compensation Denied Striking Foremen

In a case involving mine foremen's strikes of last year, the West Virginia Unemployment Compensation Board of Review ruled Oct. 17 against claims of rank and file miners for jobless pay. In a two-to-one decision the board held that rank and file United Mine Workers employed at the C. H. Mead Coal Co.'s three mines in Raleigh County were "participating, financing and directly interested in" a strike of foremen between March 30 and April 17, 1944. The board also held that U.C.T.S.E.U., District 50, was "simply a branch of the United Mine Workers of America and its policies subject to the control and jurisdiction of this organization." The ruling reversed a trial examiner who had awarded jobless benefits to the rank and file miners.

•

High Scores Feature First-Aid Contest

Utilities Elkhorn Coal Co.'s Martin No. 8 mine team won the first-aid contest in the Big-Sandy-Elkhorn Coal Mining Institute safety meet held Sept. 28 and 29 at Pikeville, Ky., in the presence of 6,000 spectators. Unusually high scores were made by the teams taking the first five places.

The winning team, captained by Harry McCarty, had a perfect score. The runner-up, Consolidation Coal Co. No. 214 team, had only one discount point against it; teams of the South East Coal Co., winner in the State-wide contest held at Lexington in 1944, and the Inland Steel Co., Wheelwright, were tied for third, South East winning the run-off with two discount points plus and Inland with two discount points minus. Republic Steel Corp. team, which finished fifth, had three discount points.

•

$70,000,000 Gas Line Proposed

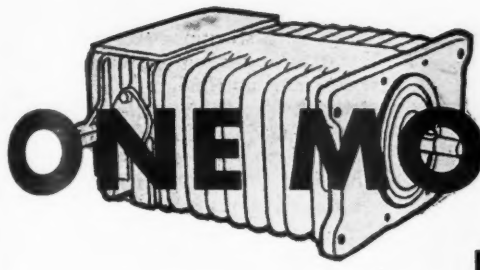
Michigan-Wisconsin Pipe Line Co., a newly organized subsidiary of the American Light & Traction Co., has filed with the Federal Power Commission an application for authorization to construct and operate about 1,216 miles of natural-gas pipeline from the Hugoton gas field, Texas, to markets in Missouri, Iowa, Illinois, Wisconsin, Indiana and Michigan, with an ultimate terminus near Detroit.

Estimated cost of the initial construction is $49,000,000, with additions during the first four years of operation bringing the total estimated cost to $70,000,000. The initial capacity of the line out of the Hugoton-Panhandle field would be 150,000,000 cu.ft. per day. Through the use of Austin and other gas-storage fields in Michigan now owned by the American Light & Traction's subsidiary, Michigan Consolidated Gas Co., a maximum day's requirements in excess of 630,000,000 cu.ft. of gas (equivalent to more than 30,000 tons of bituminous coal daily) could be supplied by the fully completed system.

Applicant proposes to begin construction about March 1, 1946, and complete initial installation on or before Oct. 31, 1947.

UTILITIES ELKHORN TEAM WINS WITH PERFECT SCORE

Left to right—Harry McCarthy (captain), Sammy Hughes, Tom Hampton, I. C. Peters, Parker Brown, Walter Hornsby (superintendent, Martin mine) and (kneeling) Elliott Murphy (patient).



ONE MOTOR *does the whole* POWER JOB

Just one motor is required to power the CLARKSON LOADER—the *lowest* loading machine on wheels. Operator handles *all* controls from one central point. No other Loader offers such simplicity of operation and control, with such a wide range of application, employing *only one* 50 h. p. motor.

Get all the *facts* about the CLARKSON before you decide on *any* Loader.

The
CLARKSON
MANUFACTURING
COMPANY
NASHVILLE • ILLINOIS

(PATENTED)

Anthracite Men Face Pollution Charges

United States Circuit Court has ordered 16 anthracite companies to answer charges of polluting the Schuylkill River to the detriment of riparian property owners near the lower end of the stream. Judge Gerald McLaughlin handed down the decision, reversing the ruling of District Court Judge Guy K. Bard, who dismissed, on a technicality, a complaint of John B. Kelly, masonry contractor and Fairmount Park (Philadelphia) Commissioner.

Mr. Kelly brought suit against the companies, charging that his property abutting the Schuylkill where it flows into the Delaware was being rendered untenable gradually by a collection of culm and silt poured into the upper river by the mining companies.

Defendants named in the suit are: Lehigh Navigation Coal Co., Lehigh Valley Coal Co., St. Clair Coal Co., Winton Coal Mining Co., Peach Mountain Coal Mining Co., Frackville Coal Co., Bell Colliery Co., Primrose Coal Co., Maryd Coal Mining Co., Jones Coal Corp., Haddock Mining Co., Otto Collieries Co., Repplier Coal Co., Glen Alden Coal Co., and Morea-New Boston Breaker Corp.

•

Major Lambur Returns To Coal Age Staff

Major Charles H. Lambur, after three years of overseas service with the Army, is returning to civilian life and the McGraw-Hill Publishing Co. on Nov. 1. He will resume editorial and mining engineering duties with *Coal Age*. He earned nine battle stars performing duty in England, French Morocco, Algeria, Tunisia, Italy, France and the islands of Pantelleria, Sicily, Sardinia and Corsica.

Major Lambur was called to service as a lieutenant in 1941 for duty in the Office, Chief of Engineers, Construction Division, Washington, D. C. After the declaration of war he formed a company of aviation engineers, went to England and constructed several airdromes. In October of 1942 he was called to headquarters of the 12th Air Force to help plan the invasion of North Africa and served there as Maintenance and Utility Officer, Corps of Engineers, for the air forces of the entire North African theater of operations. After the successful completion of the campaign he participated in the invasion of the Island of Pantelleria (the Malta of Italy) with the 2690th Air Base Command as Chief Engineer for the Allies thereon. He proceeded with the war to Sicily as Chief Engineer for the Third Air Service Command and then helped plan and execute the Italian campaign as Chief Engineer for the 12th Air Force Service Command. At Salerno his headquarters incurred 36 casualties, including the death of the Chief of Staff.

As the Allies advanced, the Islands of Sardinia and Corsica and the invasion of southern France became responsibilities of the 12th AFSC. As engineer for the Commanding General, Arthur Thomas, Major Lambur was responsible for post engineers, maintenance and utilities, engineer supply, real estate, firefighting and direction of the troops concerned.

Charles H. Lambur

While overseas, Major Lambur married Jeanine Mosca, of Nice, France.

•

I.C.C. Cuts Rates To Youngstown

The Interstate Commerce Commission has found rates on bituminous coal from various origin groups to the Youngstown (Ohio) district—Docket No. 28825—unjust and unreasonable and prescribes reasonable rates. Other destinations named in the order are Warren, Struthers, Niles and Lowellville, Ohio, and Hillsville, Sharon and Leesburg, Pa.

The decision states that the existing all-rail interstate rate from the Leetonia district to Youngstown is unjust and unreasonable to the extent that it exceeds 89c. The present interstate rate is 94c., although an 84c. intrastate rate is now in effect. The Commission also finds that the existing all-rail rate from Indianola and Russellton, in the Freeport district, to the above destinations is unjust and unreasonable to the extent that it exceeds $1.32. The existing rate is $1.44.

The present all-rail rate from the Pittsburgh district, including points on the Unity Ry. to the foregoing destinations, is found unjust and unreasonable to the extent that it exceeds $1.37. The existing Pittsburgh rate is $1.44. I.C.C. also finds that present ex-river rates from Conway and Colonna to the same destinations are unjust and unreasonable to the extent that they exceed 80c. The present ex-river rate from Conway and Colonna is 90c. to Youngstown and $1 to Warren.

The rates prescribed must be published not later than Feb. 1, 1946, on 30 days' notice.

The Commission states in its finding: "Since no destinations except those in the Youngstown area are embraced in the investigation, no finding with respect to destination relations with other districts may be made. This also is true as to origin relations involving mining districts other than those covered by the order instituting the investigation."

•

Urge Miners to Boost Anthracite Output

Jeddo-Highland Coal Co., independent anthracite operator, and the Philadelphia & Reading Coal & Iron Co., Pennsylvania producer of both bituminous and anthracite, have urged their employees to boost production to combat the post-war competition of fuel oil.

Warning of the necessity to increase output to hold their jobs, Jeddo-Highland pointed out in a letter to its men in mid-October that "oil is plentiful at a reduced price, whereas coal is scarce because of strikes, vacations, absenteeism and low unit production; therefore oil may replace anthracite, which will result in less employment in the anthracite-producing area."

G. A. Roos, general manager of P. & R., dispatched a letter to the company's anthracite employees Oct. 18 emphasizing that competition of the oil burner poses the most dangerous threat ever to face the anthracite industry. Citing the removal of all government restrictions on oil immediately after V-J Day and subsequent reduction in the price of heating oil, the message said oil was now selling below the cost of anthracite. This factor, the company said, "converted into terms that affect you and us, means that the market for our coal will shink, and, of course, you know that when that happens your work opportunity will shrink correspondingly. We believe the problem can be licked, but it's got to be tackled by both of us. Neither of us can handle it alone. . . . Our one hope of licing this oil menace on the price level is to increase our daily production."

•

Ranks Indoor Climate With Food and Shelter

At the second annual meeting of the Indoor Climate Institute held at the Book-Cadillac Hotel, Detroit, in October, T. A. Crawford, general manager, Timken Silent Automatic Division, Timken-Detroit Axle Co., was elected president to succeed Paul B. Zimmerman, who had held the office since inception of the institute. L. N. Hunter, National Radiator Co., was made first vice-president; R. E. Moore, Bell & Gossett Co., and E. N. McDonnell, McDonnell & Miller, were reelected secretary and treasurer respectively.

"America is on the threshold of the greatest home-building and modernization era in the history of the country," stated Crawford. "The heating and air conditioning industries will be called upon to in-

Mr. Sanford-Day

SOME DAY YOU'LL WANT TO HUG AND KISS ME—

—for a TIP like this

● If you never read another article in Coal Age, Brother, your life subscription has been paid for if you read the story . . . "BIG CARS Complete Modernization of Blaine Mine"—September Issue, and follow their example.

This story is typical of other experiences of mines where S-D 1-2-3 "Automatics" have been put in operation, and now this fine Company, Lorain Coal & Dock Co., adds its name to the list. My Company, the Sanford-Day Iron Works, of course, did not know the story was even being written. It is therefore, unprejudiced information and indicates the great savings being made with S-D 1-2-3 "Automatics".

HERE ARE THE FACTS! YOU FIGURE THE SAVINGS!

1—Lorain Replaced 1½ ton cars with about 1/3 as many, we guess, 5 ton S-D 1-2-3 "Automatics", with our exclusive automatic Di-Dapper Knockout door unlatching devices.

2—All new cars were equipped with S-D "Floater" Ball Bearing Wheels—a whale of a big power saver.

3—Main haul 4 miles one way.

4—Production, 2,700 tons, working two shifts.

5—Released 13 men to other jobs.

6—Probably released 4 track cleanup men to other jobs (see story). I figure that 17 men saved per day alone for 260 days per year means approximately $50,000.00 per year.

7—Increased tonnage of 3 loading machines 56½ per cent per crew (at no additional cost) based on cleaned coal shipped.

8—In addition to this increased production and savings in labor, large savings in lubrication, car-repairs and materials, reduced coal spillage, greater safety and handling fewer trips, resulted. Total savings probably about .45 cents per ton. This conforms with what other Companies have done.

● The cost of cars is a drop in the bucket compared to the savings made. We rent S-D 1-2-3 "Automatics" on a basis where you have no initial cash outlay and where the net rental charge, over a 15 year period averages less than 2 cents per ton of coal hauled by the cars.

Whether or not you are interested in cars now, don't fail to read the Lorain story. But we hope you are interested now and that you will let one of our engineers visit you and give you an estimate on what you can do.

Sanford-Day Iron Works KNOXVILLE 9, TENNESSEE

troduce into American homes the full benefit of a wide range of equipment, which will raise the standard of living through technological developments.

"The Indoor Climate Institute for the past three years has been analyzing the many phases of the related industries which contribute to controlled indoor climate. As the first step in providing the public with unprejudiced information on the subject of heating and cooling for the home, the institute has launched a program based on the idea of automatically fired central heating systems. It is a startling fact that nine out of ten homes in the United States are without automatic heating; in fact, nearly half of the homes, or 19 million, are using stoves.

"A very understandable consumer booklet dealing with central heating systems of all types burning gas, oil or coal will, for the first time, provide the public with information that will be most helpful to the new home builder and in the modernization of old homes. The booklet will contain the best thinking of the various trade associations composing the heating industry. Nation-wide distribution of the booklet by the Indoor Climate Institute and its membership will prove a definite incentive for home owners and building contractors to turn to the heating contractors and installing dealers for more information on heating systems tailored to heating requirements."

It is reported that Indoor Climate Institute will, in the near future, also take under consideration the development of a national advertising campaign and promotional activities to focus the attention of the public and all allied groups in the building industry upon the vital subject of greater indoor comfort and health through adequate, properly installed, automatically fired central heating systems in the home. Controlled indoor climate has been defined by the institute as the fourth dimension in living, ranking in importance with food, clothing and shelter.

•

Lubrication Features Illinois Meeting

Stressing the pressure application of clean lubricants, Charles I. Kraus, Chicago district engineer, Alemite Division, Stewart-Warner Corp., featured the October meeting of the Mining Electrical Group at West Frankfort, Ill., with a discussion of "Systems of Lubrication."

"Industrial engineers," he declared, "are particular about selecting the proper lubricants for equipment in their charge and careless about handling them on the job." He called attention to the "terrific" program of mechanization going on in the coal industry, the competitive position of coal with other fuels and the need to mechanize the maintenance of machines.

There are two phases of lubrication: (a) selecting the lubricant; (b) handling the lubricant. "Hand guns," he said, "are too slow." He advised moving ahead with high pressures that handle stiff greases in cold weather, either by motor-driven pumps or air pressure, always using closed dustproof containers or transferring directly from the shipping container to the lubricated bearings without exposure to dust-laden air.

A number of hand- and motor-driven devices to carry out a safe lubricating program were exhibited. Centralized lubrication for machines or for machine assemblies was illustrated by slides and by actual equipment in operation. The latter was the type that delivers measured doses of lubricant to the various points of application. This may be by hand operation at selected intervals or automatically controlled to deliver at definite intervals over the operating period.

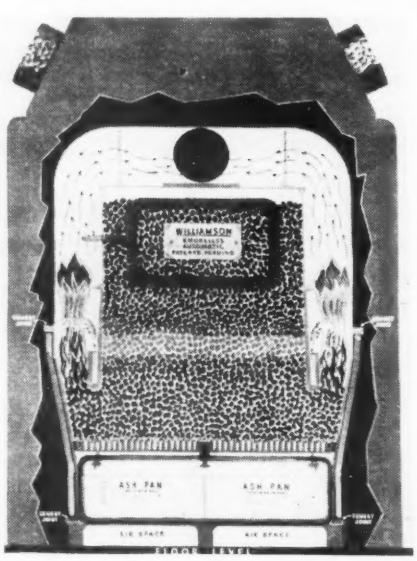
With this automatic equipment nothing is left to guess. Any failure of the lubricating system is signaled by an alarm that continues until turned off by the attendant. In closing, Mr. Kraus declared: "Centralized lubrication is epoch making and is coming like wild fire."

•

New Smokeless Heater Fueled Once a Week

A new smokeless automatic furnace that will heat a home up to eight rooms in size and will require stoking only once a week even in severe weather is to be put into production soon after the first of next year by the Williamson Heater Co., Cincinnati. It contains a magazine that will take an initial charge of 700 lb. of coal and will consume as much as 500 lb. before it has to be refueled.

The coal is burned on flat grates of more than three times the usual grate area for a conventional furnace of like capacity. Gases distilled from the coal have no way of escape except through live coals under baffles that separate the magazine from the combustion area on either side. Combustion of the gases is effected by the use of five Venturi tubes on each side of the furnace. The tubes serve the double purpose of restricting the gas flow so that ignition temperature is maintained constantly and at the same time increase the velocity of gas and air above their throats, at which points secondary air is admitted in strictly controlled quantities.



As shown at a demonstration Sept. 25 in the presence of members of the Cincinnati Council, the Manager of the City of Cincinnati, the city Safety Director and Commissioner of Buildings and several of the staff of Appalachian Coals, Inc., the ashpit door can be opened wide, the grates shaken, and the coal in the magazine stirred with a poker and yet no black smoke will be emitted.

•

CC Rating for Coal Equipment

The War Production Board is prepared to issue CC ratings for capital equipment, construction materials, and maintenance, repair and operating supplies for coal producers east of the Mississippi River and production materials for manufacturers of coal mining machinery, according to an announcement Oct. 26. Special authority for this purpose is contained in Direction 1 to Priority Regulation 28.

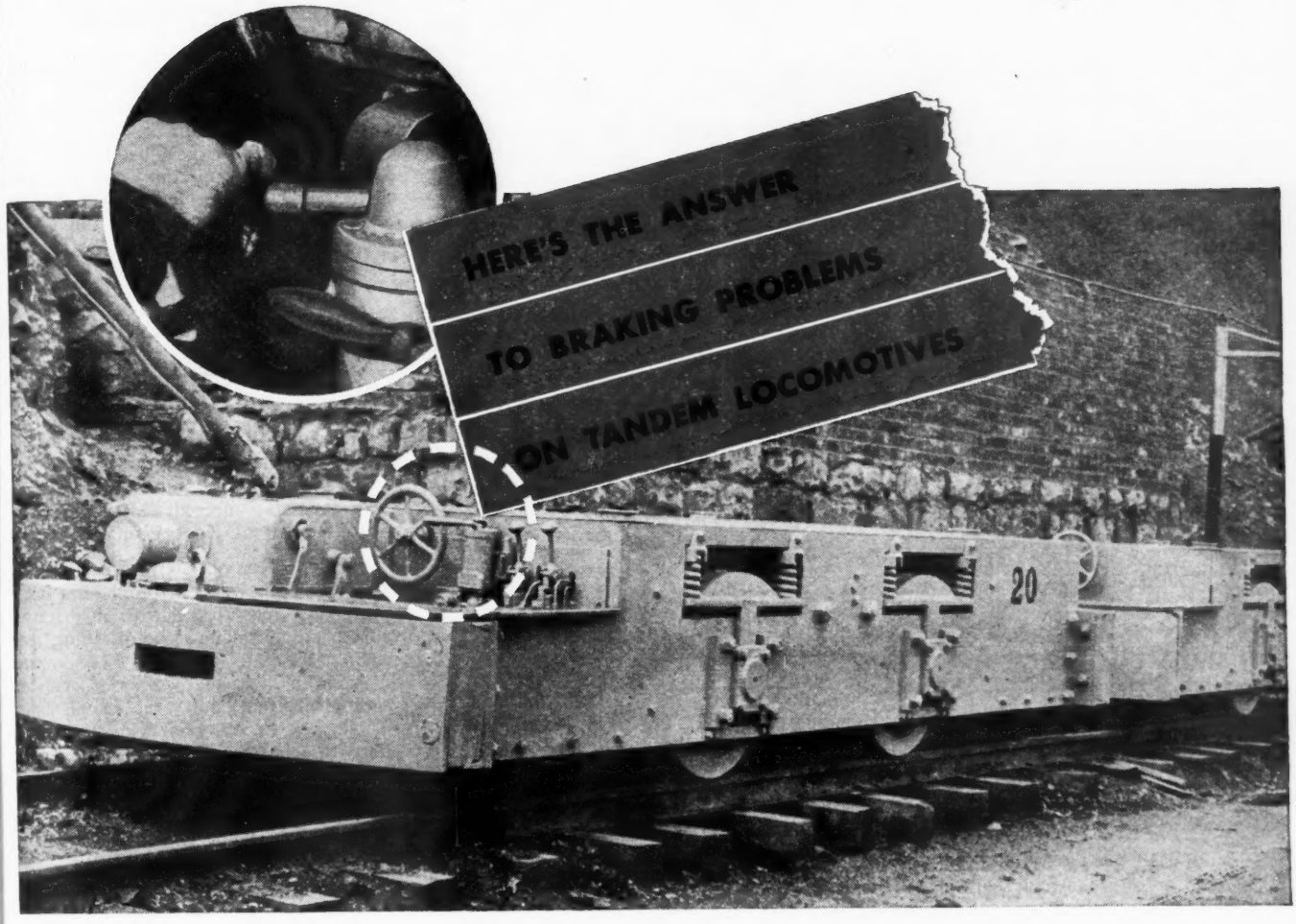
The CC rating for capital equipment may be assigned when delivery cannot be obtained without a rating, if it be shown that the equipment will result in a substantial increase in production or is needed to replace operating equipment which is in imminent danger of breakdown. For construction materials the operator must show that he cannot obtain delivery without a rating and that the construction is necessary to prevent a loss in production or will result in increased production.

In the case of maintenance, repair and operating supplies the operator must demonstrate that he is unable to obtain the item without priorities assistance. Where special repair parts for mining machinery controlled by Order L-269 are involved, the CC rating will be granted only where the repair part is essential for the continued operation of the mine and where it will not interfere with delivery of mining machinery for more essential purposes.

Manufacturers of mining machinery under U-269, to obtain the CC rating for production materials, must demonstrate that they are unable, without the rating, to obtain delivery of the minimum quantity of production material at the latest date required to maintain production of mining machinery.

Application Form WPB-541A (Revised), which is required for each application, may be obtained at WPB field offices. These forms are to be filed in the field offices where they will be processed, unless a single item exceeds $5,000 or the aggregate of all items exceeds $25,000 in cost. In such event the forms will be cleared in Washington after transmission through the field offices.

On Oct. 25, WPB issued a rewritten Priority Regulation 28 under the designation "Restricted Priority Assistance for Non-Military Purposes." This outlines the general conditions applicable to granting of the CC preference rating. The purpose is to provide relief for bottlenecks in equipment and materials necessary to pro-



Westinghouse Hydraulic Brakes

Just stop and think for a minute what it means for a motorman to apply the brakes on tandem locomotives by hand. He must set up one brake with the hand wheel, then—provided he has the time—give his attention to the other. It's not much wonder that the temptation to control the trip by motor bucking is often too strong to resist.

Westinghouse Hydraulic Brakes change the picture completely. A small movement of the lever applies both sets of brakes simultaneously, utilizing the combined weights of the two locomotives. Also, the motorman can use both braking and sanding levers at the same time, and so can stop the trip in the shortest possible distance.

Westinghouse Hydraulic Brakes add a big safety factor in trip operation, and users report a big reduction in locomotive maintenance. The equipment is small, compact and extremely rugged. It can be installed into available space, when the locomotives are in your shop for overhaul. As one maintenance foreman said, "The total cost will be offset by the savings in locomotive maintenance . . . and safer operation and faster haulage alone may justify the investment."

An interesting reprint, reporting actual results in one installation, will be sent you on request. Just drop us a line.

Westinghouse Air Brake Company
INDUSTRIAL DIVISION
General Offices: Wilmerding, Pa.

duction of items for which there is critical need.

WPB was terminated Nov. 3 and all its activities transferred to the Civilian Production Administration, headed by J. D. Small, who had been serving as WPB chief of staff. Chairman Krug's resignation had been accepted by President Truman, effective with the closing of WPB. Heads of CPA's five operating bureaus are Industrial Reconversion — Fred Glover, deputy chief of WPB's Equipment Bureau; Reconversion Priorities—Lincoln Gordon, WPB program vice chairman; Field Operations—Clarence Woodruff, serving with WPB field administration; International Supply—Robert Turner, WPB section on international supply; Demolition—G. Lyle Belsley, WPB executive secretary.

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Preparation Facilities

ACE COAL CO., Ace Breaker, Blakely, Pa.—Contract closed with Menzies Separator Co. for one 3-ft. Menzies cone to clean rice coal; feed capacity, 12 t.p.h.

MILLERSVILLE COAL CO., Millersville Breaker, Millersville Pa.—Contract closed with Menzies Separator Co. for one 4-ft. Menzies cone to clean buckwheat and rice coal, feed capacity, 22 t.p.h.; also one 4-ft. cone to clean barley coal, feed capacity, 22 t.p.h.; installation completed.

JOLLIETT COAL CO., Good Springs, Pa. —Contract closed with Deister Concentrator Co. for four SuperDuty Diagonal-Deck washing tables to handle pea and Nos. 1, 2 and 3 buckwheat sizes of anthracite.

BERNICE COAL CO., Bernice, Sullivan County, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck washing table to handle rice coal.

UNITED ELECTRIC COAL COS., Cuba Mine, Cuba, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for mine-run screening, crushing and washing addition to existing tipple; all mine-run to be broken to 7 in. prior to washing in three McNally-Norton automatic washers with combined capacity of 800 t.p.h. of 0x7-in. feed; washed coals to be classified after cleaning, with facilities for blending and selective crushing of all plus screenings sizes; ¾ in.x½ mm. to be thermally dried in three McNally-Vissac down-draft heat dryers; to be completed about September, 1946.

UNITED ELECTRIC COAL COS., Fidelity Mine, DuQuoin, Ill.—Contract closed with McNally-Pittsburg Mfg. Corp. for McNally-Norton automatic washer addition to existing washing facilities complete with conveying, dewatering and water-handling facilities; capacity, 250 t.p.h. of 7x4-in. egg coal; to be completed about Jan. 1.

WEST VIRGINIA COAL & TRANSPORTATION CO., Mason City, W. Va.—Contract closed with Roberts & Schaefer Co. for Menzies Hydro-Separator cleaning equipmen to treat ⅜x1¼-in. coal; capacity, 60 t.p.h.; installed Oct. 1.

ALLEGHENY RIVER MINING CO., Cadogan, Pa. — Contract closed with Roberts & Schaefer Co. for Hydrotator cleaning equipment to treat 0x2-in. material; capacity, 50 t.p.h.; completed Oct. 1.

CLINCHFIELD COAL CORP., No. 2 Mine, Dante, Va.—Contract closed with Roberts & Schaefer Co. for Hydro-Separator cleaning equipment to treat nut coal; capacity, 50 t.p.h.; installed Nov. 1.

INGLE COAL CORP., Elberfeld, Ind.— Contract closed with Roberts & Schaefer Co. for complete dry cleaning plant and equipment to handle 135 t.p.h. of 0x⅜-in. slack through the medium of Stump Air-Flow coal-cleaning equipment and auxiliaries.

WEST KENTUCKY COAL CO., North Diamond Mine, Earlington, Ky.—Contract closed with Roberts & Schaefer Co. for Hydro-Separator cleaning equipment to treat 6x1¼-in. coal; capacity, 300 t.p.h.; to be installed Dec. 1.

•

Coal Planer Developed In German Mines

A radically new type of coal mining machinery known as a "coal planer," coupled with plentiful slave and volunteer labor, enabled the Nazis to meet their wartime coal needs and continue virtually normal exports to satellite countries until almost the end of the war, Dr. R. R. Sayers, Director of the U. S. Bureau of Mines, reported to Secretary of the Interior Harold L. Ickes following the return of Bureau investigators from a technical mission to Europe. The costly tasks of cutting, drilling, blasting and loading coal were completely eliminated in most instances by the new invention, Dr. Sayers reported.

A plowlike machine that shaves coal from an underground seam as simply as a carpenter's plane trims a soft pine board, the coal planer is capable of mining 800 tons of coal daily from a single working place, according to information obtained by John W. Buch, supervising engineer of the Bureau's anthracite mechanical mining section and one of the Bureau's four solid fuels technicians sent overseas with the cooperation of the Foreign Economic Administration to study European mines, collect records and research documents, and interrogate mine personnel.

•

Has Coal Control Plan

Prime Minister Joseph B. Chifley announced plans Oct. 21 for the Federal Government to acquire and distribute all coal mined in New South Wales for at least five years. He declared the plans would be recommended to the Federal and New South Wales State cabinets in a few days. The scheme originated in talks with mine union officers and is intended to insure employment security.

Ohio to Plant Trees

An order for 2,500,000 trees to plant on the spoil banks left behind Ohio strip-mining operations had been placed Oct. 19 with the Ohio Division of Forestry. The order was placed by the Ohio Reclamation Association, an organization of strip miners, on recommendations made by the Central States Experiment Station of the U. S. Forest Service.

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Personal Notes

A. P. BOXLEY, superintendent at Kopperston mine, Koppers Coal Division, has been appointed general superintendent at Wharton, Weeksbury and Kopperston mines with headquarters at Kopperston, W. Va. CLEOPHUS SHORT, Kopperston mine foreman, succeeds Mr. Boxley as superintendent at Kopperston.

JOSEPH P. RUANE, lately with the U. S. Bureau of Mines at Pittsburgh, has been named by Governor Martin of Pennsylvania as an anthracite mine inspector, succeeding the late Frank B. McGovern, Scranton. Mr. Ruane was employed for years as assistant and mine foreman for the Racket Brook Coal Co. and as a safety director for the De Angelis and Northwest coal companies.

JOSEPH KENNEDY, Wilkes-Barre, Pa., an administrative employee of District 1, United Mines Workers, since 1929, has been appointed secretary to Thomas Kennedy, international secretary-treasurer, U.M.W. The new appointee, who is not related to his chief, succeeds Edward A. Lynch.

ARTHUR S. KNOIZEN has resigned as director of WPB's Mining Division effective Oct. 5. He tendered his resignation last December, effective Jan. 1, but was prevailed upon by WPB Chairman Krug to continue as director, spending a few days each month in Washington to take care of policy matters and supervise the operations of the division. On Mr. Knoizen's departure, the remaining activities of the division were to continue under the direction of Deputy Director Marcellus H. Stow until WPB was taken over by CPA.

COLONEL LOUIS C. MCCABE, who returned from the European Theater in mid-October, is to be in charge of mining operations and coal procurement for the American Gas & Electric Co., New York.

L. C. CAMPBELL, vice president, Koppers Coal Division, has been elected to fill a vacancy on the board of directors of the National Coal Association caused by the resignation of J. P. Williams Jr., who resigned because his duties have changed and he is no longer directly connected with the coal industry. Mr. Williams also has served as president of the association.

GEORGE H. LOVE, president, Consolidation Coal Co., and a member of the board of directors of the National Coal Association, has been named as a member of the group representing management in the National Labor-Management Conference,

MECHANICAL LOADING—

—in closely timbered workings or narrow entries . . .

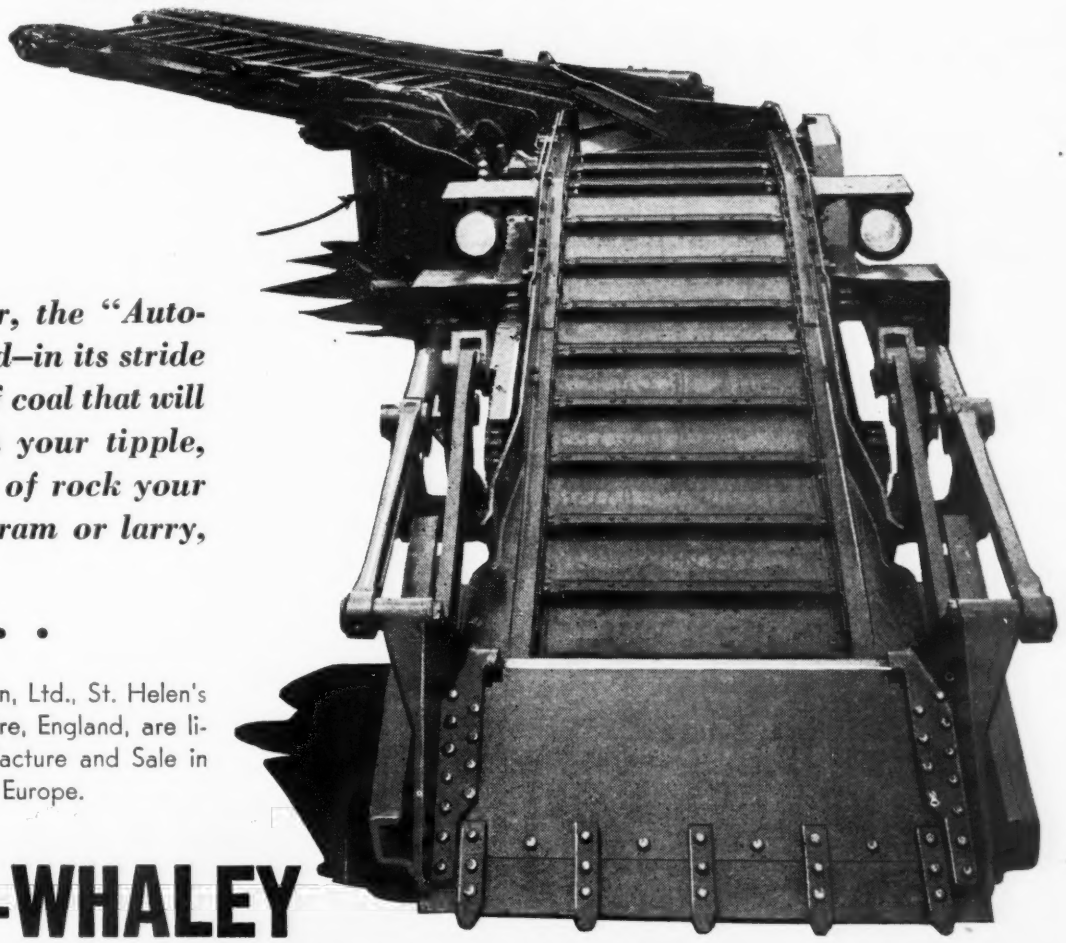
If you have to operate loading machines in closely timbered workings and narrow entries, then safety, plus maximum efficiency, is most important to you. Under these conditions no operator can afford to overlook the advantages of the Whaley "Automat" and here are two prime reasons why.

In the first place, safety of the "Automat" is well known. Sudden side-kicking of machine, knocking out of timbers, or crushing of men is not possible because the shovelling or loading action is in a vertical plane. This vertical shovelling and lifting action is particularly effective in tight shots. After moving forward under the material, it lifts and simultaneously pulls directly backward for depositing material on Jib conveyor.

In the second place, the overall width of the "Automat" is considerably less than any other machine of comparable capacity. This narrow width of the "Automat" permits working in small openings and closely timbered sections that would be too tight for other loaders of comparable capacity. Furthermore, the "Automat's" overall width of only 5 feet 8 inches allows great flexibility in use with maximum efficiency.

With these two exclusive features you can depend upon the Whaley "Automat" for maximum safety . . . for maximum efficiency, and where it is needed most . . . in closely timbered workings or narrow entries.

When writing for additional information on the Whaley "Automat" please mention your conditions. Myers-Whaley Company, Manufacturers, Knoxville 6, Tennessee.



★ ***Remember, the "Automat" will load—in its stride —any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larry, can take.***

• • •

Wm. Neill & Son, Ltd., St. Helen's Junction, Lancashire, England, are licensed for Manufacture and Sale in Great Britain and Europe.

MYERS-WHALEY

Mechanical Loaders Exclusively For Over 37 Years

BLUE PRINT FOR BETTER DUST SEPARATION

AIR-CLEANING FINES WITH THE STURTEVANT "WHIRLWIND" CENTRIFUGAL

•

FOR GREATER TONNAGE

•

MORE THOROUGH DUST REMOVAL

•

LOWER OPERATING COST

•

For the rapid and economical cleaning of fine coal the answer is . . . air separation of dust from fines, by the Sturtevant Whirlwind Centrifugal. The Sturtevant removes dust from any given fine mesh size of coal and delivers tailings with no air escape, no dust problem. The whole operation is entirely contained.

Sturtevant efficiency lies in the exact counterbalance and control of centrifugal force and air-currents to handle particles with highest efficiency—at lowest cost for POWER and MAINTENANCE. The Sturtevant is the result of 20 years' experience designing and constructing centrifugal air separators. The cement industry, where air separation is most difficult and exacting, uses hundreds, continually re-orders, has never rejected a single one.

SEND FOR BULLETIN 087

STURTEVANT MILL CO.

HARRISON SQ., BOSTON 22, MASS.

scheduled to meet in Washington with the Secretaries of Labor and Commerce early in November.

W. E. Davis, Hazard, Ky., owner of the Sunfire Coal Co., has been named as a member of the advisory council of the Kentucky Unemployment Commission. He succeeds J. E. Johnson Sr., Lexington, Ky., who resigned because of ill health.

M. L. Workman, general superintendent of the Long Branch, Helen and Stotesbury Nos. 8 and 11 mines, Koppers Coal Division, in southern West Virginia, was made general superintendent Nov. 1 of the Keystone, Carswell and Maitland mines, in McDowell County. His office will be at Kimball, W. Va.

S. H. Thatcher, superintendent of Federal No. 3 mine, Koppers Coal Division, Everettville, W. Va., has been promoted to general superintendent of Long Branch, Helen and Stotesbury Nos. 8 and 11 mines, with headquarters at Glen White, W. Va. He succeeds M. L. Workman, promoted. J. O. Davis has been appointed acting superintendent of Federal No. 3 and E. H. Shaw has been named superintendent of Long Branch, vice A. E. Barrett, who has asked for leave of absence.

James Conover, Terre Haute, has been appointed as arbitrator in mining disputes between District 11, U.M.W.A., and operators in the Indiana field. Mr. Conover, who is director of physical education in the Terre Haute schools, succeeds the Rev. Paschal Murray, who has been transferred to Lansing, Mich.

•

Strip Commission Gets Busy in Ohio

Confronted with an insistent demand from certain State officials and legislators for speedy recommendations to control strip-mining operations in Ohio, the commission set up by the last Legislature got down to work in Columbus Nov. 2. Governor Lausche told the group that coal stripping is one of the most acute problems facing the State and reiterated that he intended to submit the recommendations to the special session of the General Assembly he plans to call during the winter. He added that legislation to control the strippers could not wait until the new Legislature convenes.

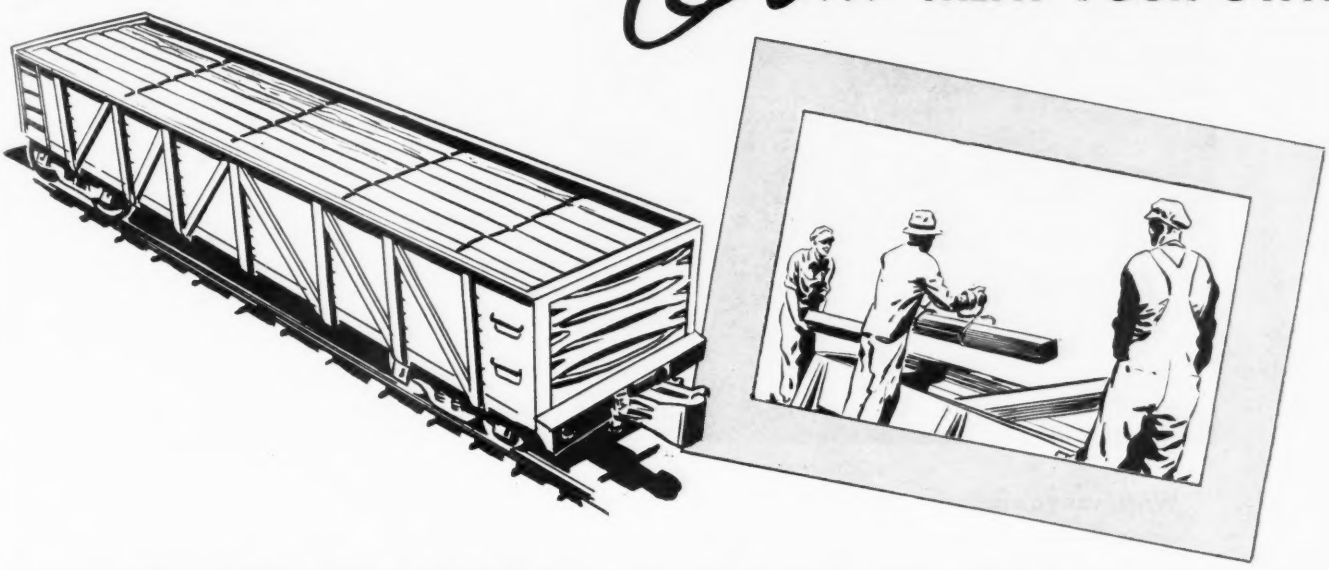
Among the suggestions to control some of the effects of strip mining was that a severance tax on strip-mine coal be used to restore the spoil banks for agricultural use. The Governor proposed that a law be enacted requiring strip operators to restore the land if the tax was not enacted.

Senator E. E. Addison (R., Columbus) is chairman of the commission; Rep. Clifton Caryl (R., Marysville) is vice chairman, and Senator Clingan Jackson (D., Youngstown) is secretary.

Rep. Fred Neel has introduced in the Missouri House, Jefferson City, a bill to assess a 5c. per ton tax on coal produced by strip-mine methods, the proceeds to be used exclusively to replace soil displaced by strip mining. The measure provides for

Take your choice...

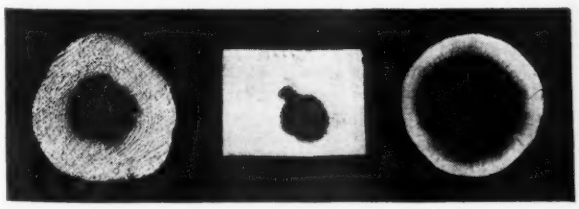
BUY TREATED TIMBER *Or...* **TREAT YOUR OWN**



OSMOSALTS *will save you money*

Conditions—and needs—vary. Some mines, because they have usable green timber readily available, prefer to treat their own timbers. Others want to buy their timbers already treated for equally good reasons. But the basic fact remains that a good many mine owners insist that the treatment be OSMOSALTS—the preservative that leaves a clean, paintable, easily handled and fire-retardant surface.

The best recommendation that Osmosalts can present is the day-in and day-out poundage that is consumed by experienced and profit-wise operators. They don't buy Osmosalts because they "think", but because they KNOW it makes wood and timbers last many times longer. Investigate the proven advantages of Osmosalts—let us show you how you can treat your own timber without expensive equipment and skilled labor or where you can secure Osmose—treated timber.



Illustrated above are cross sections of three kinds of timbers. The white outer areas, which have been subjected to standard color reagent tests, show the deep penetration of the toxic chemicals in Osmosalts.

OSMOSALTS

Nature's Method of Wood Preservation

Composition and Process Patented and Patents Pending

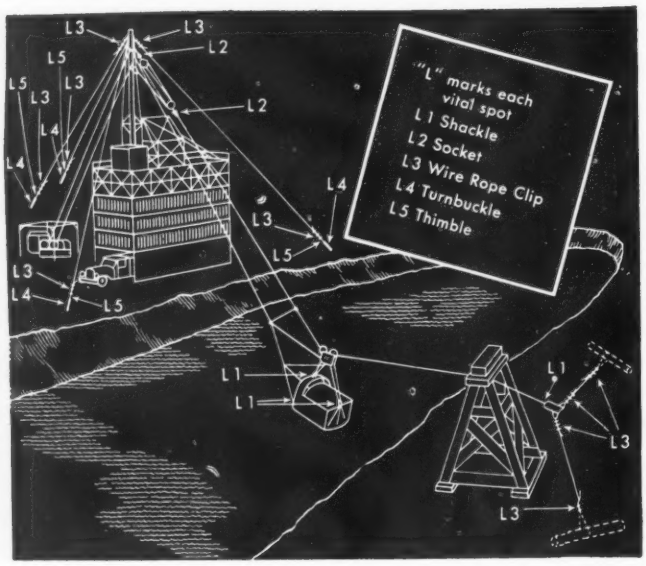
OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.

GENERAL OFFICES: BUFFALO 12, N. Y.

BRANCH AND SALES OFFICES: BIRMINGHAM 3, ALA.; DENVER 2, COLO.; KENOVA, W. VA.; HARLAN, KY.; MT. VERNON, ILL.

HANG ON TO YOUR MONEY

WITH THESE DROP-FORGED FINGERS OF STEEL



Wherever you use wire rope or chain — for hoisting and material handling in your plant, aboard ship, or on drag-lines for stripping and excavating — you can save money three ways by specifying Laughlin drop-forged fittings.

1. Save money on purchase price . . . because you can get *standard* fittings for almost any purpose from Laughlin's complete line.

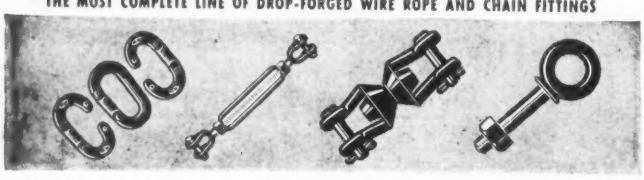
2. Save money on materials . . . because drop-forged fittings — acknowledged superior for strength and long life — give your equipment full protection.

3. Save money by avoiding accidents . . . because Laughlin's fittings have more safety features than any other line . . . examples: unique "Fist-Grip" Safety Clip and Safety Hooks.

For over 78 years, Laughlin fittings have been highly regarded for their rugged, uniform quality. For a catalog of these fittings, write today to Dept. 6, The Thomas Laughlin Company, Portland 6, Maine. Laughlin fittings are distributed through mill, mine and oil field supply houses.

LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



a five-member board in each affected county to determine whether strip mining is detrimental to soil productivity and to take action necessary for "leveling the dumps resulting from such mining and replacing the soil material and other substances removed so as to further the conservation of the soil."

Each board would be composed of the County Surveyor and the Extension Agent, both of whom would serve without pay, and three members appointed by the County Court from among representatives of farm organizations or landowners. The three members would receive $3 a day for their services, to be paid from the proceeds of the tax. The boards would have power to contract for grading the dumps.

•

General License Covers Explosives

The U. S. Bureau of Mines has issued a "general license" pertaining to explosives and ingredients that suspends the necessity of obtaining individual licenses under the Federal Explosives Act and permits the purchase and use of explosives (in so far as the licensees are concerned) on a pre-war basis. The record keeping, storing and posting provisions of the regulations under the act continue in effect.

With the relaxation of wartime regulations on non-military explosives, Dr. R. R. Sayers, Director of the Bureau of Mines, announced that the Explosives Control Division of the Bureau's Health and Safety Branch is being liquidated. The general license issued became effective Oct. 5 and will remain in effect until revoked or until the Federal Explosives Act is terminated.

•

Coal World's Fair Planned For 1946

One of the coal industry's greatest expositions is to be held in Chicago, probably next June, it was stated Sept. 12 by Lee R. Girton, president, American Retail Coal Association. Featuring the retail side of the industry, the "world's fair" in solid fuel has been assured the moral and financial support of some of the leading coal producers of the Middle West, said Mr. Girton.

Exposition plans are proceeding on the authorization of a resolution passed by the A.R.C.A. board of directors Sept. 11 empowering the president to appoint a committee to investigate the feasibility of the project and to proceed with the actual staging of the exposition when these details are out of the way.

•

L. & N. Builds Spur

Louisville & Nashville R.R. has started construction of a spur track to serve the Homestead Coal Co., which owns lands in Hopkins County, Kentucky, estimated to contain 18,000,000 tons of coal. The branch will be about five miles long and cost $150,000. It will be completed early in 1946.

BIG FIST

COAL SHOVELS

ALLOY GRADE

Here are specially designed coal mining shovels that really live up to their name—generously big in two-fisted strength and endurance that guarantees extra use-life . . . handier and easier to work with because of modern design and fine tool precision balance.

THE WOOD SHOVEL AND TOOL CO.
PIQUA, OHIO

A NATIONAL ORGANIZATION *SPECIALIZING EXCLUSIVELY* IN SHOVELS, SPADES AND SCOOPS

MANGANESE ALLOY STEEL SHOVELS

FLEXIBLE TUBING Checks Variable Costs

By W. E. BROWN, E. I. du Pont de Nemours & Co. (Inc.), Member, American Institute of Mining and Metallurgical Engineers

"Ventube" for Conveyor Mining in "thin" coal

TODAY, with many coal mine costs at a high level—and allowing for the possibility of even higher costs in the future — the margin of profit will depend to a great extent on *efficient* operation. That is why it is important to take advantage of every mining aid to control *variable* costs.

Before and during the war, many operators found that flexible ventilating duct used with approved methods is just such an aid. For flexible tubing saves time, speeds production cycles, while making working conditions safer and more healthful for the men. Such a flexible tubing, "Ventube," is manufactured by the Du Pont Company.

In contrast to rigid types of tubing, "Ventube" flexible, rubberized duct is easy to install. One man can carry 100 feet with ease, allowing others to remain at their jobs. "Ventube" sections are equipped with special patented couplings that facilitate installation. These couplings make airtight connections—directing maximum flow of air from the blower to the face.

Because the best methods for using this valuable industrial tool are the *approved* methods, operators insist that local mine laws be observed. For example, the blower should be set in a secure position at least 15 feet upstream from the last crosscut or room neck. The blower should have a permissible motor and adequate air capacity. "Ventube" should be suspended from the roof with messenger wire so that it passes over moving men and equipment. Bends and kinks in the tubing should be avoided, to maintain maximum flow of air, and if sharp bends are necessary, elbows should be used. The blower-tubing system should be operated continuously throughout the production cycle to keep the face clear at all times. Before starting the blower, the area should be checked for presence of gases—which must be removed by approved methods. In event of a power failure, the switch should be turned off so that the blower will not start automatically — before the area is checked.

* * *

"VENTUBE" is Du Pont's registered trade mark for its flexible, rubberized ventilating duct. The initial cost of installing this valuable mining aid is far less than that of many other types of tubing—and its aid in controlling variable costs will pay dividends in the long run. For more details on "Ventube" and its value for *your* mine, just contact Du Pont Technical Service. Write: E. I. du Pont de Nemours & Co. (Inc.), Fabrics Div., Fairfield, Conn.

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Ruling Favors Union On Holiday Question

The arbitrator on Point 5 involving Executive Order 9240, at issue between the Illinois operators and U.M.W. of District 12, has ruled that the holidays mentioned in that order are a part of the existing agreement and remain in full force and effect for the life of the agreement. Therefore in each State every legal holiday listed therein, whether an idle holiday or not, must be counted as a work day in order to arrive at the sixth and seventh consecutive day. He ruled that the demands of the miners on this proposition are allowed.

In ruling against the contention of the operators that with the cancellation of the executive order by the President holidays enumerated therein ought not to be used in arriving at premium pay for the sixth and seventh day of the week the arbitrator quoted from the agreement between U.M.W. District 12 and the Illinois Coal Operators Association as follows:

"And it is agreed that past procedure shall be continued, with the understanding that a legal holiday shall be construed as those listed in Executive Order 9240."

•

Name Group to Study Miners' Diseases

A committee to study compensation for workers stricken with occupational diseases in anthracite mines was formed early in October in Pottsville, Pa., with a membership representing anthracite operators and the United Mine Workers of America. W. W. Inglis, president, Glen Alden Coal Co., and Thomas Kennedy, secretary-treasurer of the union, will serve ex-officio. C. A. Garner, president, Jeddo-Highland Coal Co., and George A. Roos, general manager, Philadelphia & Reading Coal & Iron Co., will represent the operators. The union will be represented by M. F. Brennan, president, District 7, and J. T. Kershetsky, District 9.

•

May Be Bitter Fight Over U. S. Pipelines

Press reports on the progress of an investigation of petroleum resources being conducted by a special Senate committee indicate that a bitter drawn-out fight over disposition of government pipelines is in prospect. A poll of interested groups, it is said, brought out these varying views:

Natural-gas interests want the Big Inch and Little Inch pipelines used to carry natural gas from Texas to the East.

Railroad and coal-mining interests, including mine labor, want the pipelines taken out of use entirely to prevent natural gas from competing with coal as fuel.

Small oil companies want the pipelines used as common carriers of oil to get their petroleum to eastern markets. Big oil companies probably prefer to revert to using tankers for shipping their oil.

Thermoid—Key to Progress in Many American Industries

Old-style mining. Compare this to the photo shown below.

Modern mine equipment using Thermoid Air Hose.

SINCE 1880, Thermoid has contributed to the progress of American Industry. Through three wars, and the intervening periods of peace, Thermoid engineering, research and manufacturing facilities have been devoted to the production of longer life parts for coal mining.

Thermoid stands today in a position, unsurpassed by any competitor, to contribute to the post-war progress of your industry. The Thermoid Line* of belting and hose for materials handling and power transmission may contain the key to another step forward in the improvement of your process and the reduction of your costs.—"It's Good Business to Do Business With Thermoid."

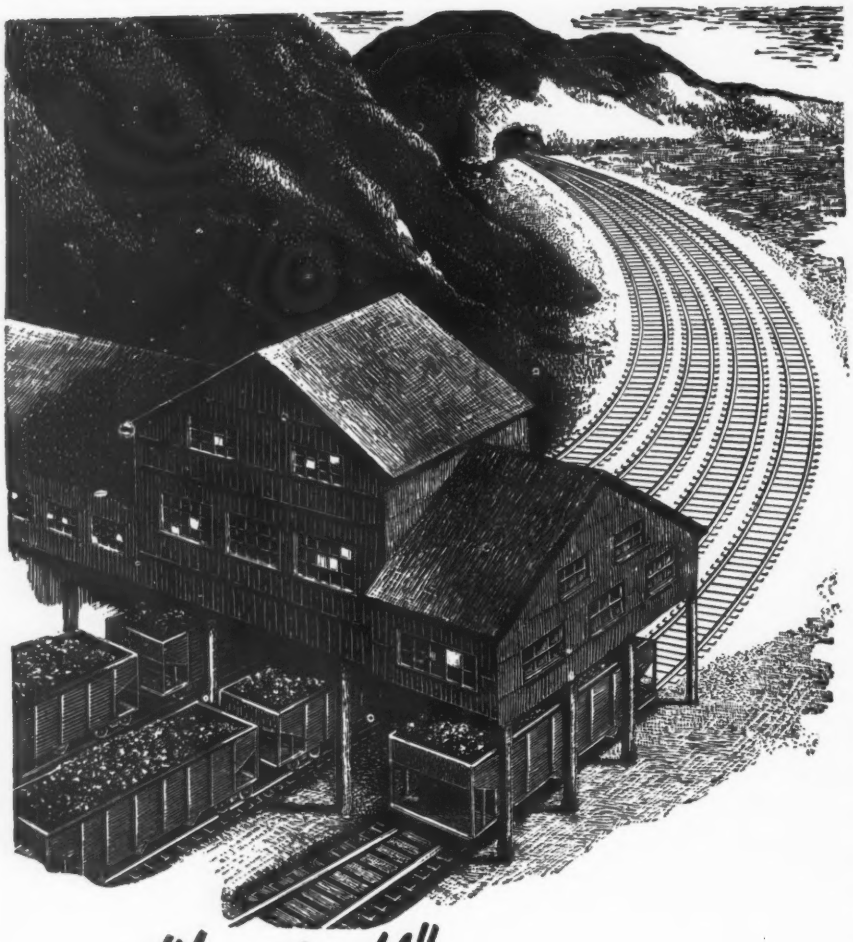
***THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.**

Thermoid Rubber

DIVISION OF THERMOID COMPANY

TRENTON 6, NEW JERSEY

Contributor to Industrial Advancement Since 1880



HOW TO *"Level off"* TRACK MAINTENANCE COSTS

After operating your cars at high speed over main haulage track for eighteen or twenty-four hours every day since the beginning of the war, you are no doubt thinking of ways and means to lower track maintenance costs.

It's logical that the first step any mine operator should take in this direction is to start where most rail maintenance work occurs—at the rail joints. By Thermit welding the open rail joints to form continuous track, rail end batter is eliminated—wear and tear on rolling stock is reduced—and power consumption is lowered, since conductivity of welded track is approximately 20% greater than bonded track and remains constant.

But such benefits as accrue from Thermit welding to "level off" track maintenance costs, do not stop there. Thermit welding also permits higher operating speeds with less spillage, since continuous track holds its line and surface better. Every Thermit weld is strong, permanent and stress-free—and costs less than bonded track over the life of the track.

Thermit welding can be done by your crew after instruction by an M & T supervisor.

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK 5, N. Y.
ALBANY • CHICAGO • PITTSBURGH • SO. SAN FRANCISCO • TORONTO

THERMIT *Welding*

M.V.A. Meets Another Setback

The Senate Committee on Irrigation and Reclamation has filed an adverse report on Senator Murray's (D., Mont.) Missouri Valley Authority bill (S. 555) stating that Congress has made sufficient provision for development of the Missouri Valley and that creation of an M.V.A. would set up a superstate—neither federal nor State and "not contemplated by our Constitution."

The measure now goes before the Committee on Agriculture for further consideration. The Commerce Committee made an adverse report on it last spring.

•

Gwynne Bill Reported In House

The Gwynne bill (H.R. 2788), providing a general statute of limitations of one year for the Fair Labor Standards Act and other federal laws, was reported out by the Judiciary Committee of the House in the second week of October. As reported the measure is changed in text from that originally introduced by Judge Gwynne. During hearings on the bill last spring, the National Coal Association argued for adoption of the statute of limitations on rights under federal laws, emphasizing the necessity for such provision in connection with the federal Wage and Hour Law.

•

Equipment Approval

One approval of permissible equipment was issued by the U. S. Bureau of Mines in September, as follows: Goodman Mfg. Co.—Type 636AK3 Entryloader; 35-hp. motor; 440 volts, a.c.; Approval 540A; Sept. 17.

•

New Mines Advance

Union Colliery Co. has erected temporary buildings and has installed machinery at its proposed new slope mine, Kathleen No. 2, south of DuQuoin, Ill. Ed. Leming, superintendent of Kathleen No. 1, Dowell, Ill., says that construction work is progressing at the new operation as rapidly as materials can be assembled. The company expects to hoist 5,000 tons of coal daily when the new mine is completed.

The Old Mine Co., headed by Harry Niehart and Charles Maton, Pana, Ill., has leased mine No. 1 of the Pana Mines Corp., Pana, Ill., and plans immediate operation, with 100 men. Oldroyd mine, Pana, Ill., has resumed operation.

East Diamond mine of the West Kentucky Coal Co., near Madisonville, Ky., has begun operations, it was announced Oct. 19. It is mechanized and one of the most modern properties of the company. A washer now being constructed to handle 500 tons of coal per hour is to be completed by Jan. 1. At peak production the new operation will employ 400 men.

It lends a helping hand to RIGGING UP

...Save installation time with limber, kink-resistant *PREFORMED* YELLOW STRAND

You've finished checking block, sheaves and drum. Now you're about to put on a new *Preformed* Yellow Strand line. Watch how its flexibility simplifies each stage of installation.

Note the willing way it comes off the reel or coil. Here's where unpreformed rope too often meets with injury. But there's no twisting, no kinking, with *Preformed* Yellow Strand—and that goes also for Lang lay and Independent Wire Rope Center constructions. Pent-up stresses have been *relaxed* by preshaping wires and strands during manufacture.

Since the ends do not flare out, limber *Preformed* Yellow Strand can be threaded quickly through blocks and sheaves... attached easily to the drum ... socketed or fastened without distorting the parts. Smooth, even first-time spooling further shortens change-over delay.

Crowning all these time-saving advantages is the *longer life* of *preformed* rope which postpones replacements, keeps men and machines on productive jobs.

Specify *Preformed* Yellow Strand by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* New York, Chicago, Houston, Portland, Seattle. *Factories:* St. Louis, Seattle, Peoria.

HAND BOOK FREE: "Wire Rope for Mining" contains useful facts, tables, pictures. Write for your copy.

ARMY E NAVY

BRODERICK & BASCOM

Yellow Strand

PREFORMED WIRE ROPE

•HOLMES EQUIPMENT

• *Designed for . . .*

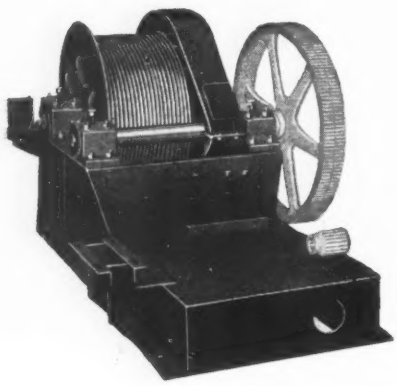
MODERN MINING

Overturning Cage

Dumps through 130° arc; permits use with solid end cars, and assures cleaning of cars. Has added advantage of elimination of maintenance on car doors.

Holmes Dust-O-Lator

This is a self-contained unit, combining a withdrawal gate, mechanical screen, and automatically controlled power unit for use in removing objectionable dust and fines from the coal as it flows to the truck.

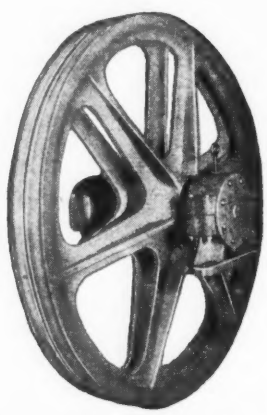


Hoists

Custom built to suit local conditions; available for steam or electric power from fifty horsepower up.

Cast Spoke Sheave Wheels

These cast, all-steel spoke sheave wheels may be had in a wide range of sizes, for either single or double strand operation. Full machine turned in the groove for long rope life.



ROBERT HOLMES AND BROS.

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

DANVILLE, ILLINOIS

Super-Pulverizing For Small Anthracite

Rights have been assigned to the Blaw-Knox Co. in U. S. patent No. 2,385,508, granted to Edgar S. Hammond, Bloomfield, N. J., on a new apparatus designed to get maximum heating value out of coal, especially small size anthracite with high ash content.

Essentially the device consists of a closed racecourse-shaped loop of strong steel tubing. The coal, ground fine, is blown in near one end by a jet of dry superheated steam. Additional steam jets send the particles round and round the course, jostling together and reducing one another further in size. An outlet near the other end takes off the inner part of the coal-powder stream, in which the particles have been reduced to microscopic fineness. Blown directly into the furnace firebox, this superheated coal burns with a thermal efficiency said to approximate that of gas.

•

Sees Record Year For Stokers

That by the middle of 1946 the production of stokers will reach the highest point on record is predicted by Marc G. Bluth, of Chicago, executive secretary of the Stoker Manufacturers Association.

"By the end of next June," said Mr. Bluth, "we expect the industry to be producing and selling stokers at the highest monthly rate in the history of the business. In the fall of 1946 we should be able to make immediate or prompt deliveries on nearly any size or model of stoker. By that time also the industry, through many individual manufacturers and their sales organizations, will be launched on the most aggressive merchandising, sales and advertising program ever seen."

•

Canada Asked to Drop Anthracite Duty

Removal of all duty on anthracite imported into Canada was urged by the (Pennsylvania) Anthracite Institute in a brief submitted to the Carroll Royal Commission on Coal. American anthracite now is subject to a duty of 50c. a ton and the impost on Scotch and Welsh anthracite is 15c. Frank W. Earnest, executive director of the Anthracite Institute, represented the American anthracite interests and G. A. Lamb, U. S. Bureau of Mines, presented statistics concerning the industry.

A group of Ontario importers of American bituminous coal recommended to the commission Oct. 10 at Ottawa the removal of the existing duty of 75c. a ton on American bituminous. It also urged limiting of government freight subventions on Canadian coal to short hauls. The brief, presented on behalf of 95 percent of the solid-fuel dealers in the Ontario area,

A New kind of
DIGEST FOR MOTOR BUYERS

IT'S DIFFERENT because it doesn't attempt to give you a lot of general technical data about motors and motor selection.

This eight-page file-size folder assumes that you know what type of motor you need. It was designed to tell you, quickly, about STAR as a source of motors and generators. It shows what sizes and types are built by Star. It describes Star's way of working with customers . . . how Star becomes their "Motor Department". It gives facts about Star's pioneer achievements in motor design. It names many hard-to-satisfy motor buyers who are long-time customers.

To bring your file on leading motor sources up-to-date . . . to learn why so many prominent concerns are turning to Star Motors to power their products and production . . . attach the coupon below to your letterhead. It will also register you to receive the Complete Catalog which is in preparation.

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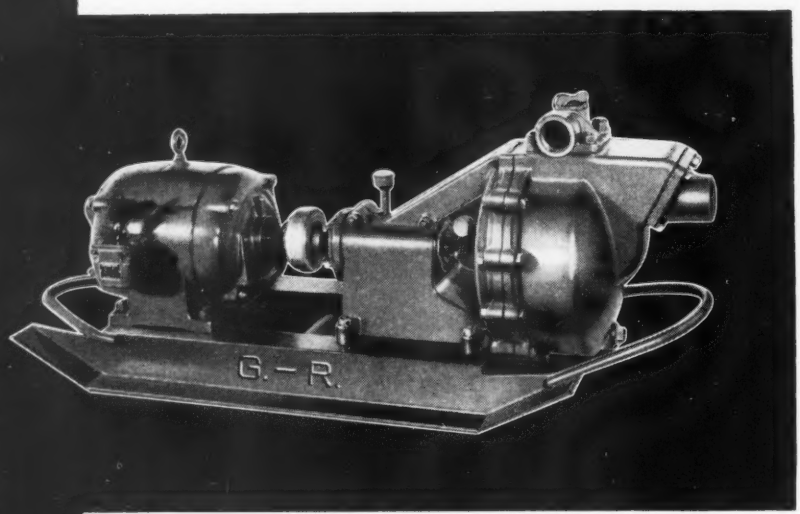
GORMAN-RUPP MAKES AUTOMATIC PUMPING *Mean Something!*



Automatic or remote control of gathering pumps is still no more reliable than the pump, itself. Gorman-Rupp self-priming centrifugals are the simplest, most rugged pumps ever offered for this service. With a throw of the switch you can start the water -- and know it has started!

No attention is ever required in priming or going from "prime" to "run". These pumps automatically self prime without fail, even though the suction line be completely dry at the time. No external controls or by-passes are used. It's right in the design of the pump.

Muck, sand, coal dust, or solids that will pass the intake strainer will go through without clogging or harming the pump and will not accumulate in the pump body.

If continued pumping of abrasive materials finally requires replacement of the impeller, it is easily reached and the repair quickly made by an unskilled man with common tools.

For the kind of automatic pumping that can be trusted, install Gorman-Rupp pumps. Special information has been prepared for mine applications. Write for a copy today.

THE GORMAN-RUPP COMPANY
306 BOWMAN STREET, MANSFIELD, OHIO

Distributed by: The Bittenbender Company, Scranton, Penna. — Henszey Company, Watertown, Wisc. — Hoe Supply Company, Christopher, Ill. — Industrial Supply Co., Terre Haute, Ind. — Guyan Machinery Co., Logan, W. Va. — Weinman Pump & Supply Co., Pittsburgh, Penna. — Central Supply Co., Greenville, Ky. — Hendrie & Bolthoff Mfg. & Supply Company, Denver, Col. — McComb Supply Company, Harlan, Ky. — Ebbert & Kirkman, Inc., Birmingham, Ala. — John T. Lees, Scranton, Penha. — Ladel Machinery & Conveyor Co., New Philadelphia, Ohio — Union Supply Co., Denver, Col.

asked that fuel oil be placed in a similar competitive position to coal instead of entering Canada duty-free.

If the supply of industrial coal in Canada should shrink further, the government is considering plans to requisition coal from non-commercial users and redistribute it to users engaged in the production of vital products.

Nine hundred Sydney (N. S.) maintenance men employed by the Dominion Coal Co. who expected wage increases of 4 to 16c. an hour in their pay envelopes Oct. 12 learned that the company had postponed payment of the increases, which are to be retroactive to August, 1944. Company officials stated that there were points in the report of J. Ley, Labor Department official, that were not satisfactory.

The National War Labor Board announced a decision Oct. 15 granting Nova Scotia miners an additional week's vacation with pay and detailing how a recent increase of 33c. in the price of coal is to be distributed in wages.

•

Gas Probe Resumed In Oklahoma City

Retention by the States of natural gas production and gathering was insisted on by Governor Kerr of Oklahoma, first witness as the second phase of the general natural-gas investigation began Oct. 9 in Oklahoma City, Okla. Reford Bond, chairman of the Oklahoma State Corporation Commission, testified on State laws, rules and practices regarding production and conservation. Congressman Ross Rizley of Oklahoma supported a better price for royalty owners and charged discriminatory actions by pipeline purchasers.

Giving testimony on reserves of natural gas at the Oct. 10 session, the State commission's engineer asserted that new discoveries since July, 1942, have increased the State's reserves by 2 trillion 700 billion feet, or more than 2 trillion in excess of estimates by other geologists.

Testimony at the first hearing, held in Kansas City, Kan., indicated a desire by the gas-producing States to conserve the gas in the best interest of the States in the area. Governor Shoeppel of Kansas, testifying as chairman of the Interstate Oil Compact, said that conservation should be handled by the States, it being indicated that he was referring to controls looking to elimination of waste in the field. The Mayor of Kansas City said he was opposed to letting the gas go east, especially for such inferior use as boiler fuel.

The State of Kansas put on an elaborate program to show that gas is valuable for many higher uses such as the manufacture of plastics and that the gas should be conserved and used in the Kansas area for such higher beneficial uses. The chairman of the Kansas Corporation Commission said the policy of the Commission is to get the best possible price for the producers and that the Commission is opposed to new lines or expansion of existing lines where the gas ultimately will go for inferior uses.

The Missouri Public Service Commission said that State was opposed to letting

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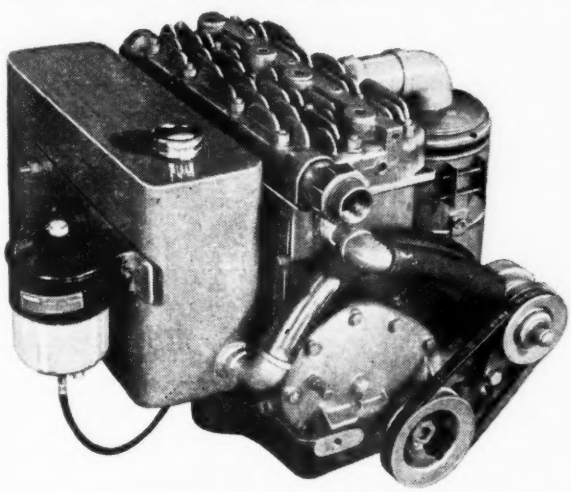
THE CANTRELL "SL" COMPRESSOR

★ If you need a compressor, you need a Cantrell. You need a Cantrell first, because every Cantrell is especially designed and built to take the punishment of hard service required of them in coal mining . . . and like it. You need a Cantrell second, because you get this maximum service for the least number of dollars. You need a Cantrell third, because of our liberal Factory Rebuilt Compressor Exchange Plan which eliminates expensive overhauling of compressors in your own shop.



★ *Shown above is the popular Cantrell, Type S-101 Compressor, shipped ready for installation with your own base, air receiver and motor, at only $348.00 F.O.B. plant.*

Illustrated above is the Cantrell "SL". A compressor outfit, complete with air receiver and base, shipped to you, ready for installation with your own drive motor, at only $484.51 F.O.B. our plant.

The "SL" is designed for stationary use in your shop or for mounting in mine car for transportation to points of service. Drive motor will be supplied, of course, if preferred, at extra cost, making this outfit complete, ready for service upon arrival.

Other Cantrell Compressor Outfits include: the "SP"— self-propelling compressor and 2-ton locomotive combined — two machines in one . . . the "CI", rubber tired complete for trackless operation . . . the "OMC", track type complete, for movement to points of service in regular trips of cars.

Let us furnish you with complete information on the "Cantrell" that suits your requirements best.

For immediate details on the Cantrell "SL" wire or phone Jellico, Tenn., 292.

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IMPERIAL-CANTRELL MFG. CO., JELLICO, TENNESSEE

Built to Cut Costs on Long Heavy Hauls

GOODALL "SSS" CONVEYOR BELTING

"SSS" means Super-Severe Service . . . and that's just what this husky, long-life belting is built for! Give it your toughest conveying jobs, on your heaviest materials, wet or dry, and let it demonstrate how Goodall quality keeps handling costs *down*.

Ores, run-o'-mine coal, rough slag, etc., are among the products carried *steadily* by "S.S.S." . . . made to specifications that *fight failure* to the limit.

"GOODALL" BRAND is another quality belting for handling lighter materials, such as coal (not run-o'-mine), dry crushed stone, gravel, ashes, cinders, etc.

GOODALL also makes transmission and elevator belting to specifications that assure long service under all conditions. Write regarding your particular needs.

Contact our nearest branch for details and prices of these and other products by GOODALL . . . "On the Job LONGER!"

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natural gas pass through the State to go east to the detriment of users of gas in the State of Missouri. A representative of the city of St. Louis said the city would like to be permitted to go on straight natural gas. It now has mixed gas. Dr. De Golyer of Texas, appearing for the gas industry, testified that the gas reserves of the country are about 140 trillion cubic feet, a much higher figure than most official estimates.

•

Name New Receiver For Elk Horn Corp.

Thomas S. Haymond, Pikeville, Ky., has been named a receiver for the Elk Horn Coal Corp., Fleming, Ky., to fill the vacancy caused by the death of J. J. Moore, Pineville. The other receivers are Howard N. Eavenson, Charleston, W. Va., and W. W. Goldsmith, Pikeville, Ky.

•

Smoke Control Group To Be Revived

Coal producers from the Appalachian producing fields and western Kentucky and representatives of some of the railroads serving that territory met in Cincinnati Oct. 15 to reactivate the Coal Producers' Committee for Smoke Abatement. Before the war the group was active in smoke abatement work in many cities in the Middle West. It assisted municipal authorities in the preparation of technical data upon which to base smoke-abatement ordinances. Headquarters of the committee is in the Transportation Building, Cincinnati.

Explaining that the committee was formed and financed by the coal industry and the railroads as their contribution to cleaner air for our cities, R. E. Howe, chairman of the committee, said the group has at its call scores of the best fuel engineers in the country and that these are available for consultation without cost to municipal authorities sincerely interested in smoke abatement.

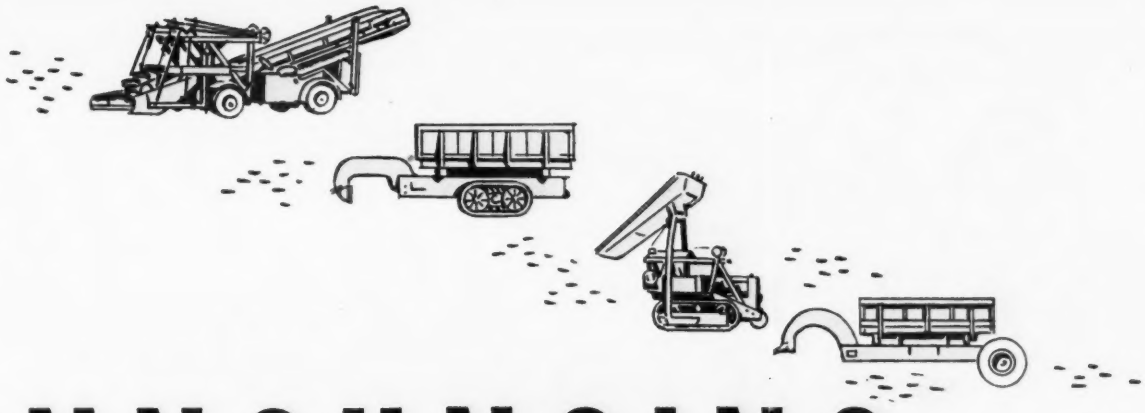
"Smoke is waste," said Mr. Howe. "It has no defense, for with the proper equipment and good firing methods there is no necessity for smoke. Smoke is merely unburned gases, which, had they been burned properly, would have supplied considerable heat."

•

Pelletizing Process Seen as Promising

Continuance of experiments in pelletizing very fine sizes of anthracite to make them more suitable for shipment and for combustion in such equipment as traveling grates, cement kilns, etc., has elicited praise from Dr. C. C. Wright, Pennsylvania State College. Further reports have been received from both Dr. Wright and C. V. Spangler, of J. F. Pritchard & Co., Warren, Pa., describing additional tests at State College and Warren.

Dr. Wright said, in part: "Now that



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a change in name

Effective at once

ATHEY TRUSS WHEEL COMPANY

has adopted the name

ATHEY PRODUCTS CORPORATION

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And its Forged-Trak Wheels, MobiLoaders Force-Feed Loaders and Rubber-Tired Trailers will bear the Trade-Mark

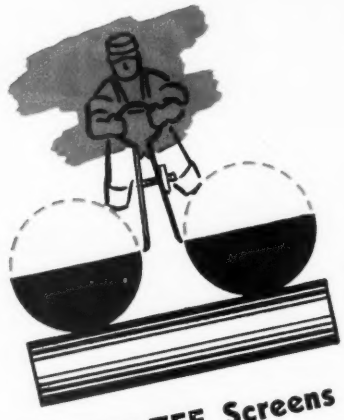
"APCOR"

Gone!

THE UPKEEP AND MAINTENANCE HEADACHES COMMON WITH COAL SCREENING

. . . we've installed "BEE-ZEE" *Round-Rod* SCREENS

Your screening maintenance problems can be reduced to a minimum, too, if you change over to longer lasting, quality-built "Bee-Zee" Round-Rod Screens. These sturdy coal screens are made of corrosion-resisting stainless steel, which makes them extremely hard and long wearing. Because of round-rod design original openings between rods are maintained over longer periods of operation. These things add up to more hours of satisfactory service, higher coal production, less screen-changing, less "time-out" for screen maintenance by busy manpower. Bixby-Zimmer Screens are built in sizes and types to exactly fit your needs . . . for sizing, dewatering and drying equipment. Investigate long-life "Bee-Zee" Screens today . . . let our capable engineering staff help you solve screening problems. Write at once for full information.



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1. ACCURATE OPENINGS MAINTAINED LONGER.
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3. ALL WELDED, RUGGED DESIGN.
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5. LESS CLOGGING, OR BLINDING; HIGH COAL OUTPUT.

The High Quality Mark in Coal Preparation Screens

Proved long life in leading coal plants everywhere

BEE ZEE

BIXBY-ZIMMER ENGINEERING CO.

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all the data are complete, I personally am much more enthused as to the possibilities of the extrusion process than I was immediately following the work at Warren. I am especially interested in the fact that the B-flotation (material direct from the froth flotation process) appears as suitable for use as does the material ground to special sizes and the fact that the pellets appear to stand up so well under combustion conditions.

"On the basis of these preliminary studies I am sure that more work would be justified, particularly along the lines of pelletizing silt directly for use on traveling-grate stokers at the colliery. Similarly the possibilities of utilizing pelletizing as a means of convenient shipping of anthracite fines for ultimate use as powdered fuel appears to have some promise."

•

To Study Oregon Coal For Industrial Carbon

Oregon coals for industrial carbon production will be studied by Oregon State College research workers under the terms of a cooperative agreement with the Bonneville Power Administration, Dr. Paul J. Raver announced Oct. 11. A memorandum of understanding signed by President A. L. Strand and Administrator Raver marked this as the first of a series of similar industrial research projects to be undertaken jointly by Northwest educational institutions and the Bonneville Power Administration.

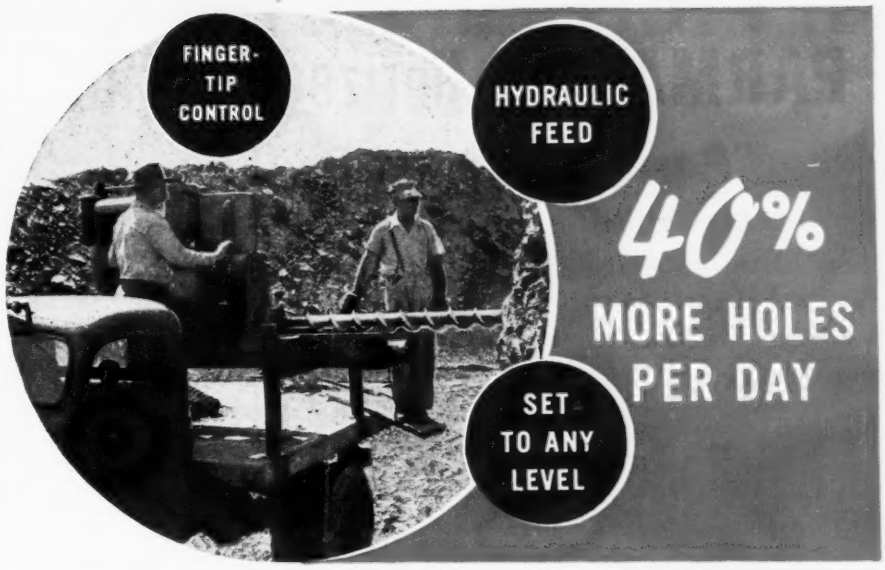
Research work will be conducted under the direction of Dr. G. W. Gleeson, dean of engineering at Oregon State College, and John N. Carothers, chief of Bonneville's industrial analysis section. Studies will include investigation of the possibility of removing sufficient ash from Coos Bay coal to produce a coke satisfactory for smelting operations at a cost competitive with other sources of smelting coke.

Outlining the Bonneville Power Administration's interest in utilization of Northwest coals for production of coke, Ivan Bloch, chief of Bonneville's industrial and resources development division, pointed out that carbon, in one of several forms, is a basic material to electrochemical and electrothermal industrial processes.

"Our work with Oregon State College on this project is part of a broad program of research being undertaken in cooperation with universities and colleges in Oregon, Washington and Montana to develop new power markets in industries soundly based on the region's natural resources," Bloch said.

He declared that the Pacific Northwest's tremendous low-cost hydroelectric power resources constituted a powerful incentive to development of electro-process industries, but pointed out that availability of a satisfactory quality of carbon at a competitive cost also would be an important factor in the growth of this type of industry.

"Carbon is an essential ingredient in smelting operations for the production of calcium carbide, ferro-alloys such as ferrosilicon and ferrochrome, phosphates,



This McCarthy machine eliminates the guesswork and hard work from horizontal drilling. Hydraulic feed plus fingertip control results in at least 40% more holes drilled per day as proved by actual operations. New type jack raises machine as much as 4' from truck bed. Compact, rugged, and heavy (3500 pounds), the McCarthy will handle 7' augers readily. Easily moved from job to job.

SEE THE McCARTHY BEFORE YOU BUY

In writing, be specific as to what you are drilling, depth, etc., so we can give you factual data.

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SALEM TOOL CO. SALEM, OHIO

Drilling and earth boring specialists. Manufacture all types of augers from 1¼" to 8" Dia. and distribute complete line of mining tools and supplies.

DON'T MINE COAL TWICE!

Freezeproof it with WYANDOTTE CALCIUM CHLORIDE

COAL *is* mined twice when a frozen shipment has to be cracked in order to get it out of the car. Time and labor are wasted. Railway cars are kept idle. Dealers can't meet delivery schedules.

It's easy to avoid this expensive delay. Freezeproof your coal with Wyandotte Calcium Chloride. Coal treated with Wyandotte Calcium Chloride is readily unloaded even in freezing weather—with no more labor than at summer temperatures. It comes out of the car the same grade as it went in—not battered, smashed or cracked.

The coupon will bring you full information about the advantages of Wyandotte Calcium Chloride. Mail it today!

WYANDOTTE CHEMICALS CORPORATION
Michigan Alkali Division
Wyandotte, Michigan

Send me literature and further information about the uses and advantages of Wyandotte Calcium Chloride.

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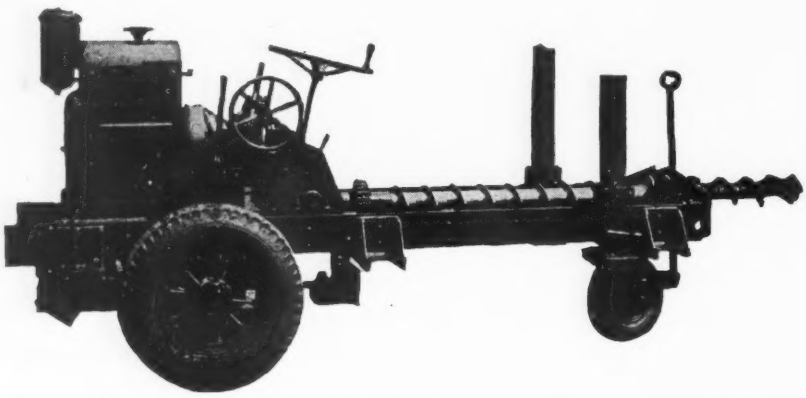
Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



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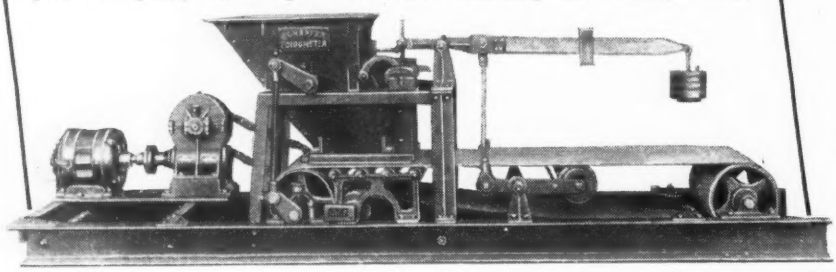
Set it . . . Forget it!

That's one of the advantages of the SCHAFFER Poidometer . . . it can be set to deliver coal in the size, weight and blend your market requires . . . and then *forgotten*, for it will do all this automatically! Poidometers can be used singly or in batteries. Automatic electric controls stop one or a dozen machines when an insufficient quantity of any one material is delivered, and start them upon receipt. By the use of a battery practically any preparation requirement can be met economically and efficiently. Poidometer units can be supplied with pulley centers up to 35'0", thus eliminating extra conveyor costs.



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SCHAFFER POIDOMETER CO.
2828 Smallman St. Pittsburgh 22, Pa.

silicon carbide, aluminous abrasives, iron ore reduction and other electro-processes," Bloch stated. "If the research work which will be carried on during the next two years by the school of engineering at Oregon State College in cooperation with the Bonneville Power Administration proves that production of coke from regional coals is economically feasible, it will mean a big advance in the industrial potentialities of the Pacific Northwest."

•

Association Activities

ILLINOIS COAL STRIPPERS' ASSOCIATION has elected as president William H. Cooke, president, Little Sister Coal Corp. He succeeds Frank F. Kolbe, president, United Electric Coal Cos. Carl T. Hayden, vice president and general manager, Sahara Coal Co., has been named vice president, and James W. Bristow has been reappointed secretary-treasurer.

NEW RIVER COAL OPERATORS' ASSOCIATION elected the following officers at its annual meeting, Oct. 11, at Mount Hope, W. Va.: J. M. McCauley, president; L. C. Campbell, vice president; P. M. Snyder, treasurer, and S. C. Higgins, secretary. The executive committee includes C. P. Anderson, L. C. Campbell, S. Austin Caperton, Owen W. Cox, L. E. Gaines, J. W. Garvey, J. M. McCauley, R. H. Morris, H. F. Morton and P. M. Snyder.

KANAWHA COAL OPERATORS' ASSOCIATION reelected the following officers at its annual meeting, Oct. 18, at Charleston, W. Va.: Frank L. Hornickel, president; D. W. Martin, vice president; Harry G. Kennedy, executive secretary; John L. Dickinson, treasurer, and Duncan C. Kennedy, secretary emeritus. Directors named were: C. W. Connor, Frank O. Harris, James Hatfield, Andrew Hogue, F. L. Hornickel, D. W. Martin, W. F. Pioch, O. B. Pryor, L. N. Thomas, Garner Williams and A. S. Wilson.

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Coal Publications

The Microseismic Method of Predicting Rock Failure in Underground Mining, Part II Laboratory Experiments, by L. Obert and W. Duvall, U. S. Bureau of Mines. R.I. 3803, 23 pp., 8x10½ in.; mimeograph; paper; free. By compressing a small rock specimen in the laboratory, microseismims (small earthquake-like tremors) were produced identical with those recorded in actual mining investigations. Coarse-grained rocks, such as granite produced as an average over a thousand tremors, and greenstones less than 200. With greenstone, the first tremor normally occurs at an applied pressure of 41 percent of crushing strength; with limestone, at 21 percent, and with granite at 41 percent, but a Quincy granite trembled first at 5 percent of crushing strength. The tremors created depend partly on the applied pressure and partly on the rate of its application.

How to Handle Collective Bargaining Negotiations, National Foremen's Insti-

ATTERSON speeds up COAL STRIPPING with TOURNAPULLS

Two Tournapulls strip 20' of sand loam off 4' seam of rock and shal

...s are spread in 4 to 6 inch lifts in 30 seconds. ... overburden is used to improve haul road.

... strata is shot, overcast by shovel, and then ...ed and hauled to dump by LeTourneau 15-yard ...tor-drawn Carryalls.

...ourneau Dozers are used to clean up coal, level ...cast rock for scraper loading, and to push-load ...er-drawn and Tournapull Scrapers. CM5X

The Patterson Construction Company of Monongahela, Pa., knowing of the revolutionary economies made by Turnapulls in the construction field, are applying them to their stripping operations in Greene County, Pennsylvania.

The mine, on which operations are illustrated, located in the Sewickley Seam, lies in a large deep valley. Coal is 48" to 60" thick, covered by an average overburden of 20' of sandy loam and 4' of rock and shale.

180 cubic yards on 600' one-way haul

The LeTourneau Turnapulls (Super C's . . . 15 yards heaped) load the sandy loam, haul and spread it on the dump. On a 600' one-way haul they have been averaging 180 cubic yards bank measure per unit per hour. They take cuts 3 to 6 inches deep, are pusher loaded with a 113 h.p. crawler tractor and LeTourneau Dozer in 60 to 90 seconds. They haul at 14 mph, spread on the dump, or to fill-in on haul roads, in 4 to 6 inch lifts. Positive ejection with the powered tailgate completely cleans the bowl, dump takes only 30 seconds.

Shale and rock handled by Carryalls

Shale and rock seam is drilled and blasted, overcast to the opposite side of highwall, leveled with a LeTourneau Dozer into the path of two tractor-drawn LeTourneau 15-yard Carryall Scrapers which are pusher loaded for a 200 foot one-way haul to the spoil bank. The coal surface is cleaned with another LeTourneau Angle-dozer. Coal is shot and shovel-loaded to trucks which take out an average of 500 tons daily over a seven-mile haul to the tipple at Poland.

Let us show you how to figure for yourself the cost of stripping your properties with modern Tournapulls. You will find big savings possible on any overburden that must be hauled or rehauled. The equipment set-up costs less, there is less horsepower needed, less weight of equipment, less manpower required. Layout and operation is simple, extremely flexible. Let your local LeTourneau distributor and our LeTourneau field engineers help you make your own comparisons.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

Manufacturers of Tournapulls*, Angledozers*, Bulldozers, Tiltdozers*, Carryall* Scrapers, Power Control Units, Rooters*, Tournatrailers, Tournacranes*, Tournatrucks*, Sheep's Foot Rollers, Tournarope*, Tournaweld*, Tournalifts*.

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Stearns
Spout
MAGNETS
Remove the
TRAMP IRON

Tramp Iron is Bad—may ruin your machinery, hold up production, may menace safety, may cause disastrous explosions and fires, will bring damaged stoker headaches for your customers.

Stearns Automatic Spout Magnets, electrically energized for more power, will do a surprisingly fine job in catching tramp iron in your processing flow. And—the value of the accumulated scrap metal will help, if not entirely pay for the magnetic equipment.

In sizes to fit your conveying system. Write for data, describe your layout, send drawing if possible.

STEARNS MAGNETIC MANUFACTURING CO.
661 S. 28th St., Milwaukee, Wis.
SEPARATORS PULLEYS CLUTCHES BRAKES

tute, Deep River, Conn. 38 pp., loose leaf, 9⅛x10½ in.; mimeograph; imitation leather; price, $5.

Guarding Trolley Wires in Mines, by E. J. Gleim, U. S. Bureau of Mines. I. C. 7332; 25 pp., 8x10½ in.; paper; mimeograph. Sketches of trolley guard hangers, temporary guards, sliding guards, safety gaps, swinging and inclined guards, and self-closing guards.

Shaft Sinking by Rotary Drilling, by D. H. Platt, U. S. Bureau of Mines. I. C. 7336; 19 pp., 8x10½ in.; paper; mimeograph. Shafts of circular cross-section, lined with steel casing having a cement seal are structurally superior to shafts lined with timbers and sheeting. Shafts in unconsolidated and water-filled formations are economically and safely sunk by the rotary drill.

Use of Salts to Allay Dust on Shuttle-Car Roadways in Coal Mines, by E. Thomas and I. Hartman, U. S. Bureau of Mines. R. I. 3828; 18 pp., 8x10½ in.; paper; mimeograph. In normally humid mines, use of flaked calcium chloride or of refined, granular sodium chloride effectually allays dust, providing, when properly applied and maintained, a good road for traffic. Moisture absorption does not appear to be promoted by the use of wetting agents. Shuttle cars agitate road materials, insuring adequate penetration of moisture.

Ball and Roller Bearing Engineering, by Arvid Palmgren. 270 pp., 7x10 in.; cloth. SKF Industries, Inc., Philadelphia, Pa. Describes eleven types of bearings, proportions, accuracy and tolerances, forces and motions, carrying capacities etc., design of bearing applications, mounting and dismounting, lubrication and maintenance, and bearing failures.

•

Mine Fatality Rate Advances Farther

Accidents at coal mines of the United States caused the deaths of 71 bituminous and 16 anthracite miners in August last, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 47,800,000 net tons, the accident death rate among bituminous miners in August last was 1.49 per million tons, compared with 1.43 in the preceding month and 1.61 in August, 1944.

The anthracite fatality rate from accidents in August last was 3.45, based on an output of 4,644,000 tons, against 1.83 in the preceding month and 2.52 in the eighth month a year earlier.

For the two industries combined, the accident fatality rate in August last was 1.66, compared with 1.47 in the preceding month and 1.71 in August, 1944.

Fatalities during August last, by causes and States, as well as comparable rates for the first eight months of 1944 and 1945, were as follows:

U. S. COAL-MINE FATALITIES IN AUGUST, 1945, BY CAUSES AND STATES

	Underground												
State	Falls of roof	Falls of face	Haulage	Gas or Dust Explosions	Explosives	Electricity	Machinery	Other causes	Total Underground	Shaft	Open-cut	Surface	Grand total
Alabama	1	...	1	...	...	...	2	...	4	...	...	...	4
Colorado	1	...	...	...	...	...	...	...	1	...	...	...	1
Illinois	3	...	...	...	...	...	...	...	3	...	...	...	3
Indiana	...	...	1	...	...	...	1	...	2	...	...	1	3
Iowa	1	...	...	...	...	...	...	...	1	...	...	...	1
Kentucky	6	...	1	...	...	1	...	1	9	...	...	...	9
Missouri	1	...	1	...	...	...	...	...	2	...	...	...	2
North Dakota	...	...	...	...	...	...	...	...	...	...	...	1	1
Ohio	...	...	1	...	...	...	...	...	1	...	2	...	3
Oklahoma	...	...	...	...	...	...	...	1	1	...	...	...	1
Penns. (bituminous)	8	...	2	...	...	...	2	...	12	...	...	2	14
Tennessee	1	...	...	...	...	...	...	...	1	...	...	...	1
Utah	1	...	1	...	...	...	...	...	2	...	...	...	2
Virginia	2	...	...	...	...	...	...	...	2	...	...	...	2
Washington	...	...	...	...	...	...	...	...	...	...	...	1	1
West Virginia	17	...	1	...	1	...	1	...	20	1	...	1	22
Wyoming	1	...	...	...	...	...	...	...	1	...	...	...	1
Total bituminous	43	...	9	...	1	1	6	2	62	1	2	6	71
Pennsylvania (anthracite)	7	2	1	3	...	1	...	...	14	...	...	2	16
Grand total	50	2	10	3	1	2	6	2	76	1	2	8	87

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-August, 1944 and 1945

	Bituminous				Anthracite				Total			
	Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons		Number Killed		Killed per Million Tons	
Cause	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945	1944	1945
Underground:												
Falls of roof and face	400	284	0.950	0.725	55	45	1.263	1.235	455	329	0.980	0.709
Haulage	153	133	.363	.340	16	17	.367	.466	169	150	.364	.350
Gas or dust explosions:												
Local	7	9	.017	.023	2	4	.046	.110	9	13	.019	.030
Major	22	39	.052	.100	...	...	....	....	22	39	.047	.091
Explosives	11	14	.026	.036	13	6	.298	.165	24	20	.052	.047
Electricity	25	17	.059	.043	2	2	.046	.055	27	19	.058	.044
Machinery	22	32	.052	.082	..	2	....	.055	22	34	.047	.080
Shaft	4	8	.010	.020	4	1	.092	.027	8	9	017	.021
Miscellaneous	88	10	.209	.025	10	8	.230	.219	98	18	.211	.042
Stripping or open-cut	18	17	.043	.043	6	2	.138	.055	24	19	.052	.044
Surface	36	39	.086	.100	9	8	.206	.219	45	47	.097	.110
Total	786	602	1.867	1.537	117	95	2.686	2.666	903	697	1.944	1.944

* All figures subject to revision.

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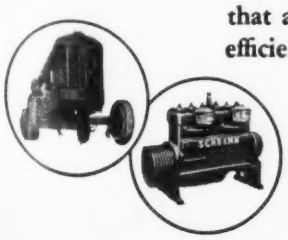

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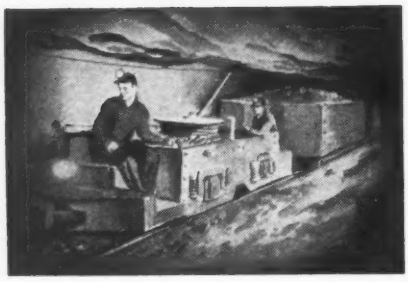

Equipment News

Electrode

Harcast, an all-position mild-steel electrode for welding and repairing cast iron, is offered by the Harnischfeger Corp., Milwaukee. Representing years of research and experimentation, Harcast is said to fuse well with either mild- or medium-carbon steel, making it well suited for joining cast iron with other types of steel. With a yield point of 50,000 lb. p.s.i., the deposited metal has an ultimate tensile strength of 60,000 lb. Usable with either a.c. or d.c. machines (straight or reverse polarity on d.c.), Harcast works well at low amperage, it is said, thus minimizing the dilution effect at the fusion zone and permitting a high quality of machining.

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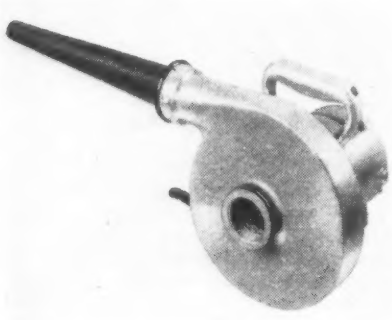
Electric Blowers

Ace Co., 12-40 North Orange St., Ocala, Fla., offers Ace electric blowers. With two speeds, they are recommended



for removing dust with a powerful blast of clean, dry air from large motors, machines and places that cannot be reached by hand or compressed air; also with a gentler but positive blowing or suction action for small motors, instruments and other light-duty jobs. There are four models, Model A (picture) having a 1-hp. motor.

•

Acidproof Apron

A light-duty industrial apron to give maximum protection against oil and which also is acid-, caustic- and waterproof is offered by the B. F. Goodrich Co., Akron, Ohio. It is double coated by the calender method with Ameripol, the company's exclusive type of synthetic rubber. Made in two sizes, 29x35 and 34x45 in., constructed with hemmed edges and attached neck and waist tapes, it is recommended for use where a lightweight garment is needed to protect a worker from acid, oil, caustic or water. The garment also is said to have high abrasive resistance.

•

Dot-Weld Process

Metallizing Co. of America, 330 W. Congress St., Chicago 7, Ill., has developed the new Mogul dot-weld process, which is said to eliminate residual stress and contraction resulting from high-temperature welding. The dot-weld process utilizes the new Mogul quench-arc weld machine, a high amperage, low-voltage unit operating on alternating current, and the dot-weld pistol. This combination affords depths of 0.001 to $\frac{3}{32}$ in., yet it is said all danger of high temperature is eliminated by an air-pressure unit built into the dot-weld pistol that quenches the electrode while the arc is in a constant stream of cooling air.

•

Rubber-Tired Trailer

Athey Products Corp., 5631 West 65th St., Chicago, has added to its line a new rubber-tired unit known as the PD-10 trailer. This new two-way dump unit is designed for use with the Caterpillar DW-10 tractor for high-speed hauling on mining and other earth-moving projects. With a maximum capacity of 15 tons, it is engineered to take full advantage of the weight and power of the DW-10 tractor. The hydraulically controlled PD-10 has an approximate shipping weight of 15,000 lb. Its heaped capacity is 10 cu.yd., and struck, 8 cu.yd. It discharges its load from either side at a 55-deg. angle. The unit is mounted on 14x20 16-ply tires.

Thawing Outfits

Acroil Products Co., West New York, N. J., offers heavy-duty oil-burning thawing outfits which it asserts will open solidly sealed frozen steel car doors in 10 minutes regardless of temperature or weather. Operating with inexpensive white-water kerosene, the 2,000-deg. F. flame, according to the manufacturer, will not blow out even in driving wind or snow.

•

Drop Feed Oiler

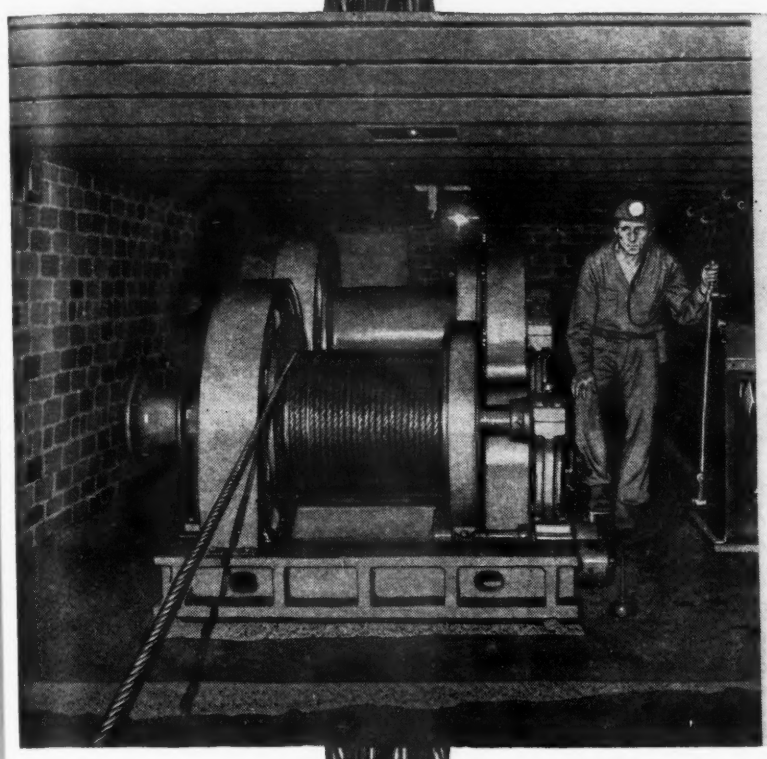
Oil-Rite Corp., Milwaukee, offers a new drop feed oiler for heavy-duty applications which combines visibility and adjustability in a small unit. The new unit can be used wherever small-capacity feeding is required; said to be especially suitable for very slow or medium feeds. Oil is fed by gravity through an oil port that can be adjusted within a wide range. It can be wide open, providing a steady flow of oil, or it can be closed entirely. Thus an extremely slow drop feed is possible even with light oil. The rate of feed remains practically constant, it is said, regardless of oil level.

•

Asbestos Gaskets

Greene, Tweed & Co., 238th St. and Bronx Blvd., New York 66, N. Y., offers Palmetto high-pressure folded asbestos gaskets, asbestos metallic sheet packing and asbestos metallic gasket tape.

The gaskets, for handholes, manholes and tube plates of boilers and other apparatus subject to heat and pressure, have two features of particular importance: each



J&L PERMASET PRE-FORMED WIRE LINES

Precisionbilt from wire that can stand hard use. Mining operations are tough on wire rope — abrasion, water, muck combine to test its endurance. Rope made from J&L wire, drawn from J&L Controlled Quality Steel, has the stuff it takes to stand up to these conditions. From the mines where J&L gets its raw materials to make the steel . . . to the installation in your mine . . . J&L controls every step in the making of its Precisionbilt Wire Rope.

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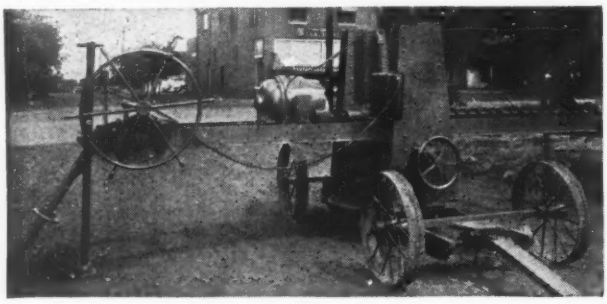
JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, AND MUNCY, PENNSYLVANIA

Movable up and down in a range of 4 feet
Can be set at an angle up or down . . .



★
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"UNITED" Horizontal DRILL

YEARS of actual experience in the field by our engineers is back of the design of this unit. The drill frame is mounted on a turn table which allows the frame to turn 360°. It is powered by an electric motor or gasoline engine. Mounted on steel wheels or rubber tires. This equipment again emphasizes the ability of our engineers to design for the users' best advantage.

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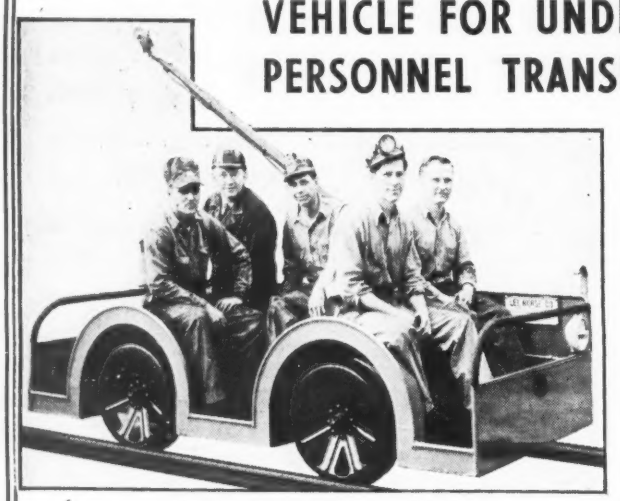
PITTSBURG *Trailers, and Coal Mine Equipment* **KANSAS**

Lee-Norse "MINE JEEP"

A SPECIAL FIVE MAN VEHICLE FOR UNDERGROUND PERSONNEL TRANSPORTATION



•

Gets you there quicker . . . without fatigue . . . you can do a better job.

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We completely overhaul and factory rebuild various kinds of mining machinery—cutters—loaders.

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Lee-Norse Company
CHARLEROI, PA.

gasket is carefully hand blocked to accurate size and the seam is on the outside, away from the pressure. These gaskets are made from brass-wire inserted asbestos yarn woven into a strong cloth, coated and cemented with a heat-resisting compound, folded and pressed into shape.

The woven cloth from which these gaskets are made also is available in sheet form as asbestos metallic sheet packing. These sheets, supplied with a heat-resistant coating, are recommended for cutting gaskets for cylinder heads of gas, oil and steam engines, and for similar services.

Asbestos metallic gasket tape also is made from the same cloth. The folded tape, coated with heat-resisting compound, is said to be particularly convenient for making gasket strips such as are required along the lip of large rectangular tanks.

•

Safety Vents

J. A. Zurn Mfg. Co., Erie, Pa., offers safety vents with rupture diaphragm that are said to give a wide margin of protection against fire and explosion to tanks and processing vessels containing inflammable liquids. A combination of valve and rupture diaphragm, they contain a special disk or rupture diaphragm that will break to relieve excessive pressures which build up within a storage tank.

These units also are said to have the ordinary function of permitting a safe escape of inflammable gases from a tank. This is accomplished by means of a specially designed unit with perforated-brass flame barrier plates. Safety vents are made in cast bronze, steel, semi-steel or cast iron, with flange or butt-weld connections, in a wide range of sizes.

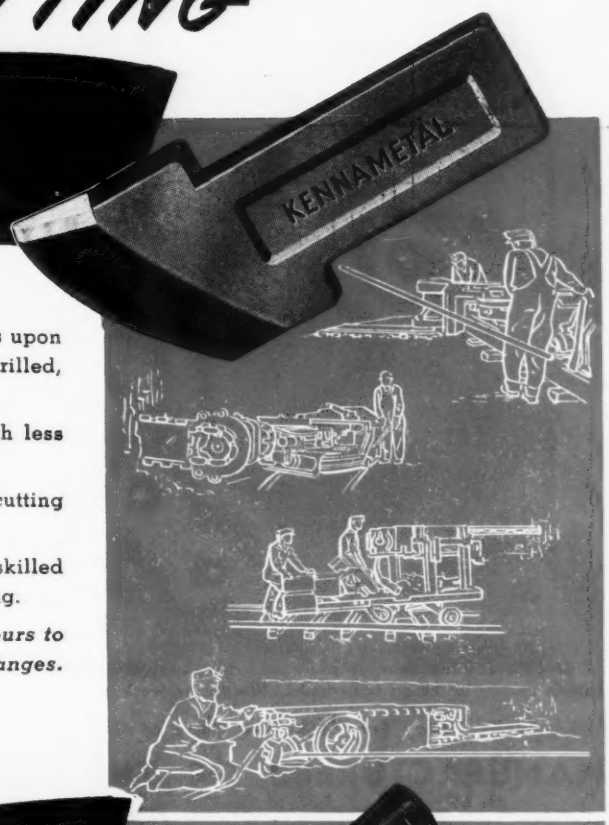
•

Safety Indicator

Lustrolite Cleveland Corp., Cleveland, offers the Radi-Glo button, a safety marking button utilizing radioactive energy from radium that makes it glow in total darkness without need for recharging or activation by light. It is recommended for marking hazards and danger points as well as for attachment to first-aid kits so that they can easily be found even if lights fail.

Companions in FASTER COAL-CUTTING

KENNAMETAL UNDERCUTTER BITS



The efficiency of every machine—and man—in your mine depends upon the small edge of the undercutter bit. For, before coal can be drilled, blasted, loaded, and transported, it must be cut.

Faster—Tough, hard Kennametal tips cut through normal face with less power; slice across more places before becoming dull.

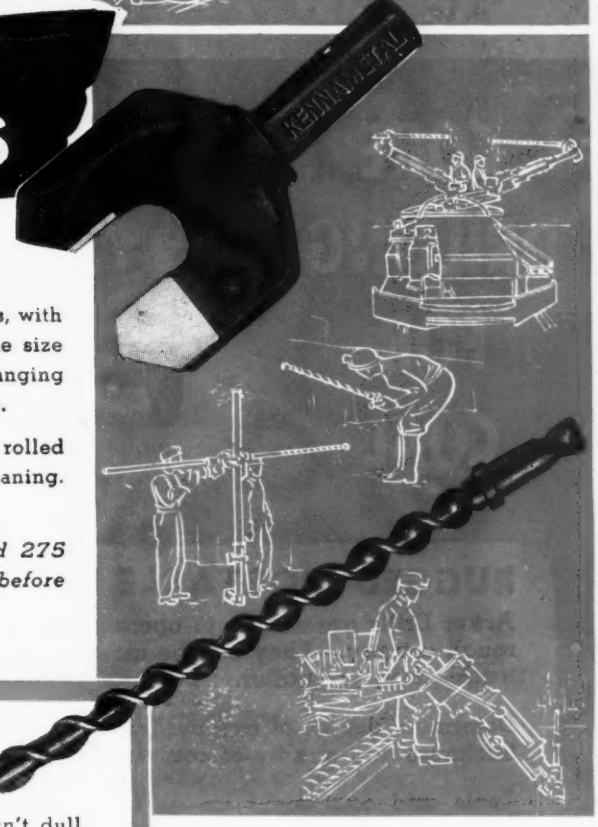
Better—Less "bug-dust"; cleaner cutting close to bottom; harder cutting jobs made easy.

Cheaper—Exceptionally long life; idle machine time minimized; skilled men do more productive coal cutting, less unproductive bit changing.

Here's a typical performance report: With steel bits it took 2 hours to cut across 22 foot place in sulphur-streaked coal—three bit changes. Kennametal did same job in 15 minutes—no bit changes.

Kennametal Undercutter Bits are available for most standard chains.

KENNAMETAL DRILL BITS



Distinctive two-way drill bits also have brazed-in Kennametal tips, with cutting edges contoured for fast, uninterrupted drilling to accurate size throughout bit life, including many regrinds. Six sizes available, ranging from 1⅜" to 3", for hand-held, and track or post-mounted machines.

Augers are also made by Kennametal. Solid-center, heat-treated rolled steel shapes, to minimize whip. Double spiral for efficient hole cleaning. Driving shanks shaped for quick "twist of wrist" change.

These are representative results: One Kennametal bit drilled 275 feet of blast hole in bottom rock; another 850 feet in coal—before resharpening was necessary.

AND FOR MORE EFFICIENT STRIPPING

Kennametal Inc. produces four sizes of three-way drill bits—3½", 4", 5", and 6½", having cutting tips of Kennametal. They are speeding drilling operations in major stripping pits. One operator reports, "6½" Kennametal Bit drilled 900 feet, and wasn't dull enough to need resharpening". Another states, "A Kennametal Bit, used for a month, is still cutting faster than any other type bit we ever used."

Catalog M-1—giving specifications and prices of Kennametal Bits and Augers—will be sent promptly, upon request.

KENNAMETAL

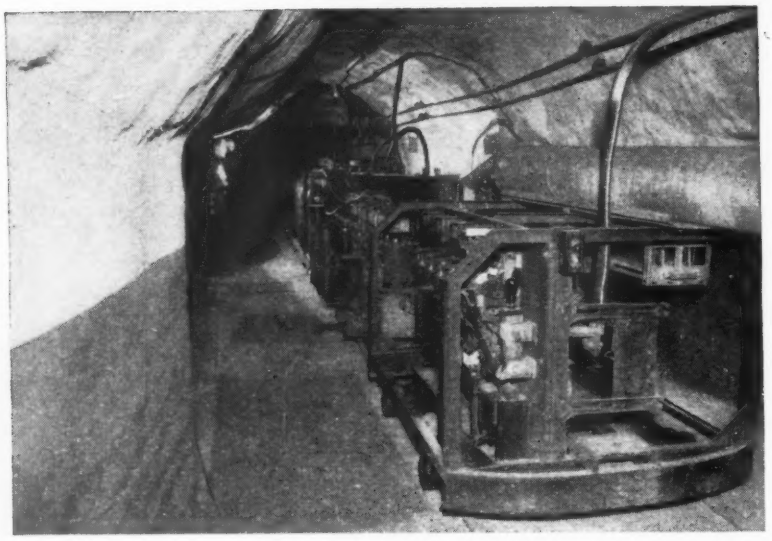
SUPERIOR CEMENTED CARBIDES

KENNAMETAL *Inc.*, LATROBE, PA.

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



Above is an underground substation room which is lined with 2" mesh reinforced "GUNITE". Similar uses of plain and reinforced "GUNITE" in haulways and entries are saving money for many coal mines. We do the work or sell the equipment.

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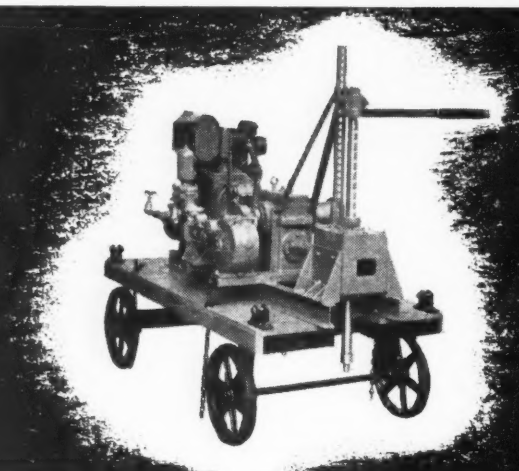
MANUFACTURERS OF THE "CEMENT GUN"

CORE DRILLING FOR COAL



RUGGED PORTABLE CORE DRILLS

Acker Drills are simple to operate and easy to move in rough country.—They can be mounted on a small motor truck—drag—or trailer.

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Determine depths of overburden before strip mining and thickness and quality of coal seams

• • •

Tools and equipment for all sub-surface exploration

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Send for literature

ACKER DRILL CO. SCRANTON 3, PA.

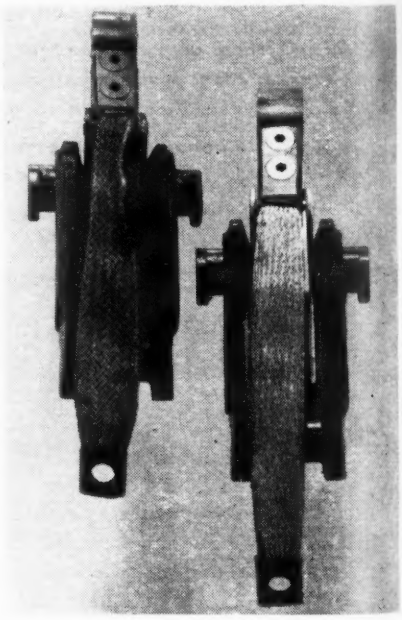
Slide Rule

Pickett & Eckel, 53 W. Jackson Blvd., Chicago 4, Ill., offers the Deci. Point slide rule manufactured of lightweight Dow metal. Dow metal is recommended for superior accuracy as it is said not to be affected by climatic conditions of heat, cold or moisture; is surfaced with a flat white plastic that is impervious to water or chemicals and virtually immune to abrasion from regular use. On this plastic the scales are placed by a special process said to insure extreme accuracy and legibility.

•

Rag-Filled Plastic

High arc resistance is claimed for rag-filled Melmac plastic insulation, offered by American Cyanamid Co., 30 Rockefeller Plaza, New York 20. An electrical control part used on mining machinery that broke down because of a short circuit between main-line contactors contrasted with a stock part shows that the metal portions of the mechanism fused upon contact with the great heat whereas the plastic insulation



was scarcely affected. Melmac is recommended to producers of heavy mining machinery as insulation on electrical controllers. It is said to have excellent electrical properties, heat resistance, exceptional strength and shock resistance plus the characteristic of resisting a nitrate deposit even when exposed to an electric arc in the presence of moisture.

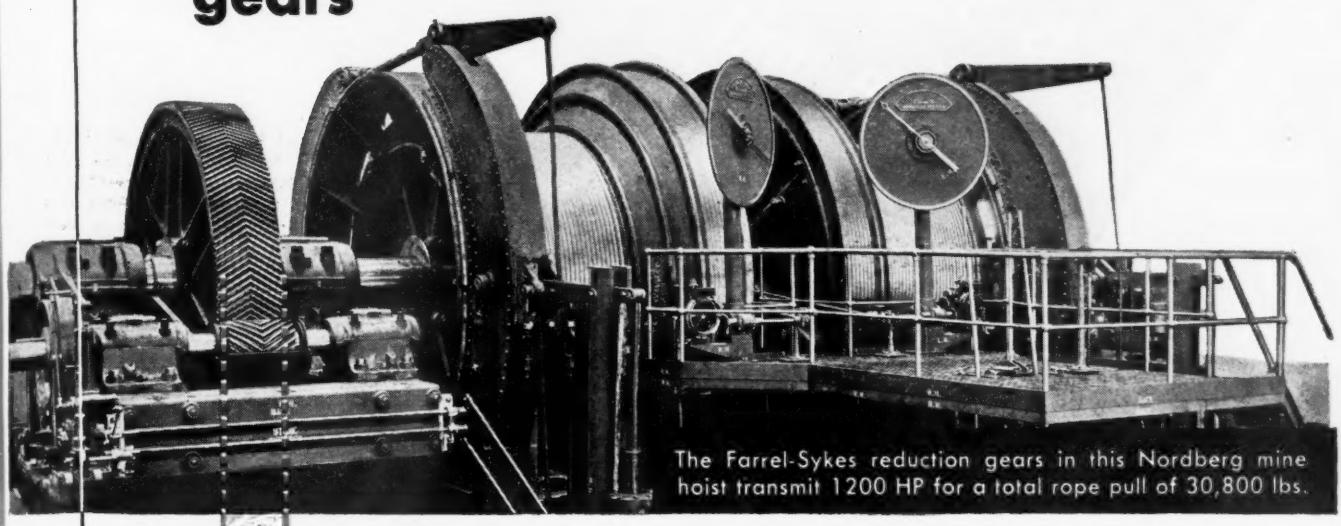
•

Heavy-Duty Tire

A wire-corded heavy-duty tire said to be practically blowout-proof will be offered soon by the Firestone Tire & Rubber Co., Akron, Ohio. The tire, now in the final experimental stage, according to the manufacturer, has withstood severe field and laboratory tests, has been proved in various kinds of actual heavy-duty service and is designed to give exceptionally long mileage

BACKBONE

gives these mine hoist gears



The Farrel-Sykes reduction gears in this Nordberg mine hoist transmit 1200 HP for a total rope pull of 30,800 lbs.

full working width

The reduction gears in this Nordberg mine hoist are the Farrel-Sykes continuous-tooth herringbone design—the famous *Gear With a Backbone.*

The *Backbone,* formed by the juncture of the two helices, without a center groove, puts the *entire* face width to work. This gives the gears extra strength and greater capacity to withstand the shocks, stresses and wear encountered in mine hoist service.

Overlap or interlacing of the teeth, gradual engagement and inclined line of pressure distribute the load on the teeth uniformly, reducing wear and maintaining correct tooth action throughout a long gear life. Opposed helices balance and absorb axial thrust within the gear member, eliminating harmful thrust loads and resultant stresses on other parts of the machine.

Precision generation by the Farrel-Sykes process makes these gears exceptionally quiet and smooth-running, even at high speeds. They operate with equal efficiency in either direction of rotation, providing safe, even power transmission to the hoist as it raises or lowers its load. Gears can be made in halves for convenience in assembly.

For further information on Farrel gears and gear units, write for descriptive bulletins.

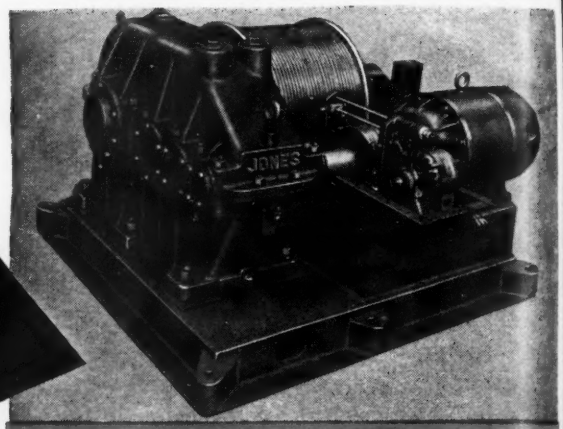
FARREL-BIRMINGHAM COMPANY, INC. • 344 Vulcan St., Buffalo, N. Y.

Plants: Ansonia, Derby and Stonington, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles, Tulsa, Houston, Charlotte

FB 260

Farrel-Birmingham

When the drive is built into the unit

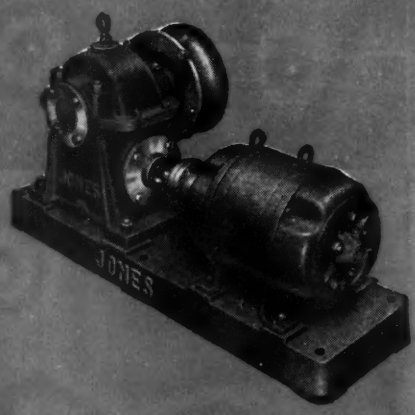


● Jones Skip Hoist Drive built as a complete unit by the Jones organization in several types with base to take any motor specified by the purchaser. This drive is equipped with all the modern protective devices such as cam or nut type limit switches, solenoid or disc type brakes and slack cable switches. The drives are single, double or triple reduction Jones Herringbone Speed Reducers.

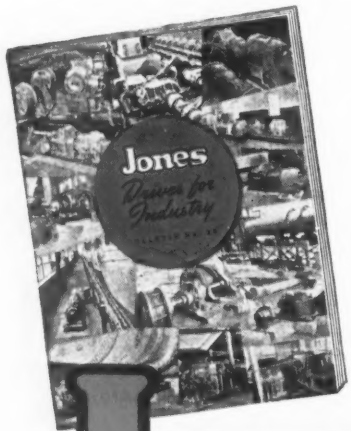
FOR many years the Jones organization has been developing various types of drive units in which Jones special or standard speed reducers form an important integral part of the unit.

The car puller, door hoist and skip hoist drives illustrated and described here are typical specimens of Jones Unit Drives. These machines are built as complete units by the Jones organization with base to take any motor specified by the purchaser.

The Jones organization has also worked with a great many manufacturers in the application of Jones gears and speed reducers to an extremely wide variety of complete assemblies. You are invited to make full use of this experience in connection with any power transmission problems that you may have.

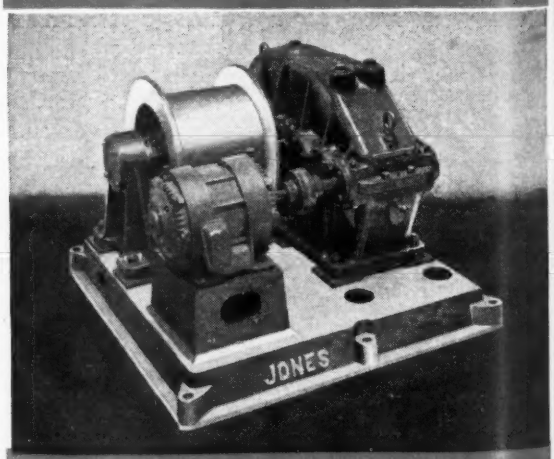


● Jones door hoists are built in many ratings and may be installed with almost any convenient arrangement of sheaves and cables. Base will take any standard motor. No limit switches of any kind are required with this unit.



W. A. JONES FOUNDRY & MACHINE CO.
4401 W. Roosevelt Road
Chicago, Illinois

Bulletin No. 80, "Jones Drives for Industry", may be helpful in giving you a complete picture of the Jones products, engineering services and manufacturing facilities that are available for helping you solve your drive problems.

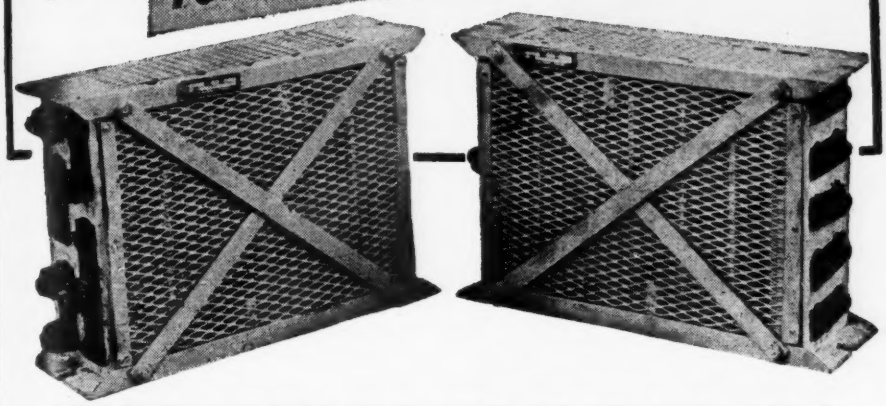


● A complete Jones car puller unit. These outfits are for use with wire rope and are manufactured in a wide range of capacities to suit the number of cars to be handled in each plant.

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS ● PULLEYS CUT AND MOLDED TOOTH GEARS ● V-BELT SHEAVES ● ANTI-FRICTION PILLOW BLOCKS ● FRICTION CLUTCHES ● TRANSMISSION APPLIANCES

G.M.C. RESISTANCES for MINE LOCOMOTIVES



G.M.C. Resistances are built in any size required. Their design incorporates helical coils of alloy wire, supported by an external frame, thus completely protecting the units from injury. Coils are highly resistant to the action of mine water and mill fumes; and vibration does not affect them Insulators are of a type not harmed by sudden changes of temperature. Constructon includes a shield to protect coils from outside injury and foreign objects which might cause "shorts"

Full information on G.M.C. Resistances will be sent immediately on request
Write today!

GUYAN MACHINERY COMPANY
Logan . . . . . West Virginia

Specializing in

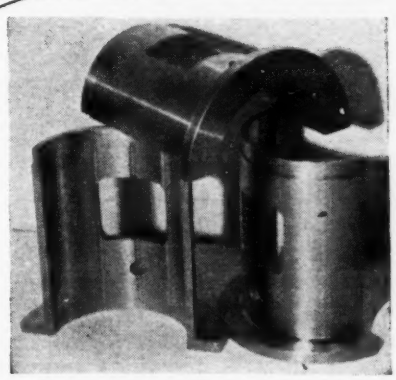
BRONZE BEARINGS and BUSHINGS

for coal mining equipment, we give a money-back guarantee of superior service, lower maintenance cost.
A specific formulae, designed for each application.

Promet Bearing Bronzes can be run without lubrication in emergencies, even at red heat, suddenly cooled and returned to service without injury.

Will not cut, stick to the shaft under ordinary conditions, nor powder under severest service.

Can be machined at more than 500 feet per minute—twice as fast as phosphor bronzes.



PARTS FOR ALL EQUIPMENT

Jeffrey, Goodman, Westinghouse, General Electric, Sullivan, Joy, etc.

PROMET BAR STOCK MACHINES EASILY

Rounds, hexagons, squares, rough cast, semi-finished, fully machined. Cored stock all sizes (by 1/8" steps) from 1/2" minimum core to 12" O.D. and 12" lengths.

PROMET BRONZE CASTINGS TO YOUR PATTERNS

Any size, shape or section, up to 5,000 lbs. each. Pattern making, designing and machining.

PROMET MINE SPECIAL BABBITT IS DIFFERENT

Has a lead base and fine velvety grain. Withstands tremendous loads at high speeds and temperatures which would be dangerously high with other babbitts. Will not score, cut or powder even in lubrication failures. The coefficient of friction is considerably less than that of tin babbitts, reducing power loss and wear.

PROMET THE Engineered BRONZE

THE AMERICAN CRUCIBLE PRODUCTS CO.
1307 Oberlin Ave., Lorain, Ohio, U. S. A.

Prompt deliveries can usually be made from stocks maintained at

BECKLEY, W. Va., The Universal Supply Co., Corner 2nd Ave. and 2nd St.	Phone 3642
LORAIN, OHIO, The American Crucible Products Co.	Phone 6983
WILLIAMSON, W. Va., Williamson Supply Co.	Phone 1200

Other Representatives

ALTON, ILL., Frank E. Rhine, 623 Blair Ave.	Phone Alton 3-8624
BIG STONE GAP, VIRGINIA	C. P. Cawood
BIRMINGHAM 1, ALA., O. D. Lindstrom Equipment Co.	P. O. Box 103
CANTON, OHIO, Bowdil Company, Waynesburg Road	Phone 29-808
MT. LEBANON, PA., J. E. Nieser, 720 Roselawn Ave.	Phone LE 9876
DENVER, COLO., Urquhart Service, 16th Street at Blake	Phone Main 0331

in such fields as strip mining of coal and ore and similar activities.

Fine metal wire cord with high tensile strength is firmly bonded with rubber to provide the foundation of the new tire. Because of the strength of the metal, fewer plies are required, hence the walls are thinner, which is said to contribute toward cooler running.

•

Counterbore Set

To save production time, save space and cut tool inventory costs, Robert H. Clark Co., Beverly Hills, Calif., offers a set of four adjustable counterbore spot facers said to have exceptional cutting range. Identified by the number CS-1H, these four tools cut any fractional or decimal diameter within 1/4 to 1 3/8 in. outside diameter. Each one is said to be quickly and easily adjustable to a wide range of sizes.

•

Protective Coatings

The Alkacite series of protective coatings for industrial service is offered by Protective Coatings, Inc., Detroit. It is said that when applied to any porous surface—metals, wood, concrete and similar or allied products—it is characteristic of Alkacite to penerate the surface, effectively blocking off moisture penetration, acid reaction, retarding corrosion, rotting and disintegration of the structural material.

•

Synthetic Rubber

Dow Corning Corp., Midland, Mich., announces the commercial availability of Silastic, a silicone rubber, produced in various stocks for molding, extruding, coating and laminating. Largely because of their inorganic origins, these rubbery organo-silicon oxide polymers, it is said, remain elastic after heating at temperatures up to 500 deg. F. and retain flexibility at temperatures as low as -70 deg. F.

Silastic stocks now available are said to have exceptional temperature stability, tensile strength of from 200 to 330 lb. per square inch, elongation ranging from 70 to 115 percent, high resistance to water, brine and oil, and electrical properties of the following magnitude: Dielectric constant at 1,000,000 cycles of 5.0 to 7.5;

Operators say—"20% MORE EFFICIENT than average Storage Battery Locomotive"

THE
GREENSBURG
"MONITOR"

12 MONITORS
In use by Franklin County Coal Corporation
8 at Herrin, Ill. 4 at Royalton, Ill.

FEATURES

Double knee-action; better trackability. Floating power; less power consumption. Quick acting footbrake, essential for quick stopping, especially behind loading machines. Brake shoes that follow the wheels (due to knee-action). Adjustable Timken Bearings throughout. Huskiest transmission in any storage battery locomotive. Never leaks oil. Never add oil. Use regular auto oil; change every 6 months. Strong. Simple Design. Low maintenance. Backed by over 25 years of experience with Storage Battery locomotives.

The Greensburg "Monitor" Type is the first real improvement in storage battery locomotives. ENTIRELY NEW IN DESIGN. Its efficiency and economy have been proven in actual mine use. Operators report 20 to 25% more coal hauled than with other battery locomotives having the same battery capacity. From 6 to 10 ton capacities: track gauges 36" to 56½". Other locomotives from 1½ tons to 10 tons, 16" to 56½" track gauge.

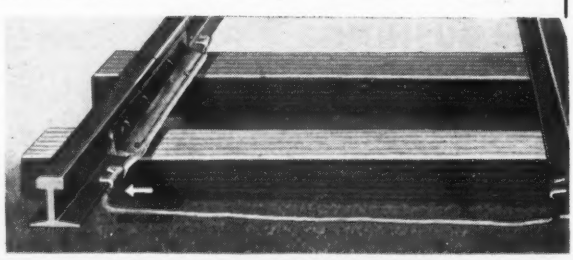
MORE HAULING FOR LESS STORAGE BATTERY CAPACITY

THE GREENSBURG MACHINE CO.
Makers of Custom-Built Storage Battery Locomotives
101 STANTON ST., GREENSBURG, PA.

Mescoweld Rail Bonds

M8xF combination line and cross bond, illustrated, accomplishes the double function with three welds instead of four. Type M8-F has identical terminal but is for straight line work only. Ask for catalog of 18 types. Immediate deliveries.

HEmlock 8332.



MOSEBACH ELECTRIC & SUPPLY COMPANY
1115 Arlington Avenue . . . Pittsburgh 3, Penna.

FLEXIPIPE
The improved flexible tubing for mine and tunnel ventilation

This flexible air tubing is ready for immediate, easy installation. On account of its flexibility, it can be put up or taken down in a fractional part of the time required by a more rigid means of face ventilation.

Write for free sample and full information.

BEMIS BRO. BAG CO.
412 Poplar Street, St. Louis 2, Mo.

power factor at 1,000,000 cycles of 0.13 to 0.18 percent; and dielectric strength of 500 volts per mil.

•

Industrial Notes

ALLIS-CHALMERS MFG. CO., Milwaukee, has named Arthur R. Tofte as manager of its advertising and public relations department. A member of the department since 1938, he succeeds George J. Callos, who resigned to become vice-president and account executive for Klau-Van Pietersom-Dunlap Associates, Inc., Milwaukee advertising agency. Mr. Tofte was a member of the advertising department of Bucyrus-Erie Co. immediately before going to A.-C. W. A. Yost, Jr., has been appointed as assistant manager of the steam turbine department. He formerly was in charge of the department's marine division, coming from the Elliott Co., of Pennsylvania, where he managed that company's steam turbine department. R. N. Landreth has been named assistant to the vice-president of the general machinery division. He will continue to reside in Washington, D. C., and function on assignments from Milwaukee.

E. I. DU PONT DE NEMOURS & CO., INC., Wilmington 98, Del., has appointed Dr. Lawton A. Burrows as assistant manager in charge of research, technical division, explosives department. He succeeds Dr. W. E. Lawson, a former director of Eastern Laboratory, Gibbstown, N. J., who has been assigned to special duties. Dr. Wesley M. Nagle has been appointed assistant director at Eastern Laboratory.

MCNALLY-PITTSBURG MFG. CORP. has expanded its Pittsburgh (Pa.) branch both in space and personnel. The enlarged offices, under the direction of William S. McAleer, eastern district manager, are in the Bessemer Building, Sixth St. and Duquesne Way.

MACWHYTE CO., Kenosha, Wis., has elected R. P. Tyler, general sales manager, to membership on its board of directors to fill a vacancy caused by the resignation of Mrs. George S. Whyte.

HERCULES POWDER CO., Wilmington, Del., has appointed LeRoy Keane as director of sales of its explosives department, vice C. C. Gerow, who had held the position since 1919. Mr. Keane joined the company as a salesman in 1918 and was named as assistant manager of the Pittsburgh (Pa.) office of the explosives department in 1932, becoming manager four years later. John M. Martin has been appointed manager of the Pittsburgh office to succeed Mr. Keane.

GENERAL ELECTRIC CO. has appointed L. F. Kummel as sales manager, underfloor distribution systems, of the conduit products division, Bridgeport, Conn. He formerly was district manager of the construction materials division in Cleveland. Ralph C. Dean has been appointed sales manager of the conduit products division, appliance and merchandise department. He joined the company in 1930. The Motor Division of the Apparatus Department, Schenectady, N. Y., has been reorganized,

Wyoming

RED EDGE

RIVETLESS SOCKET FEATHERWEIGHT *Coal Shovels & Scoops*

AN ANSWER TO THE MINER'S DREAM

1 - Featherweight.

2 - Perfect Balance.

3 - Rivetless Socket. (No possibility of sharp edges on socket or handle)

4 - Alloy Steel, Heat Treated Blade.

5 - Increased efficiency and reduced costs the reason for Red Edge preference.

AMES *Since* 1774

"AMES" PRODUCTS

SHOVELS FORKS
SPADES HOES
SCOOPS RAKES
POST HOLE DIGGERS
AGRICULTURAL HANDLES

AMES BALDWIN WYOMING CO.

Parkersburg, W. Va. North Easton, Mass.

DRY SAND

will get more coal out faster

...as produced by **Perfection** Cone Stove Sand Driers

Spinning wheels won't pull heavy loads. It takes sand... dry sand... running freely from locomotive to track to give hard-driving wheels traction and real pulling power!

You can depend on having plenty of dry sand at HALF the usual cost when you use the "PERFECTION" Cone Stove Sand Drier. The standard size dries 8 to 10 tons in 8 hours... and we can increase the size of the same drier up to 12 to 14 tons capacity. Let one of these units prove itself in your operations.

When you want perfection in a Sand Drier... ask for "PERFECTION"! Write for full particulars now. Remember "PERFECTION"... It's the best!

PRINCETON Foundry & Supply Co.

PRINCETON WEST VIRGINIA

ST. LOUIS SNAPSHOTS

HE CAN RELAX...
HE HAS A
RESERVATION
AT THE HOTEL
Mayfair
EIGHTH AND ST. CHARLES

being separated into four divisions and one section. W. H. Henry, formerly manager of the Motor Division, has been appointed assistant manager of the Industrial Divisions in charge of the motor business. The following divisions managers have been named: A. W. Bartling, manager, Fractional-Hp. Motor Division; Elliott Harrington, manager, Induction Motor Division; J. T. Farrell, manager, D.C. Motor Division, and P. A. McTerney, manager, Synchronous, Large D.C. and Gearmotor Division. E. A. Green, who during the war was on war manufacturing assignments, returns to the motor organization as general assistant to Mr. Henry. D. E. Moorhead, recently returned from the armed forces, is appointed assistant to Mr. Henry to give particular attention to motor sales activities.

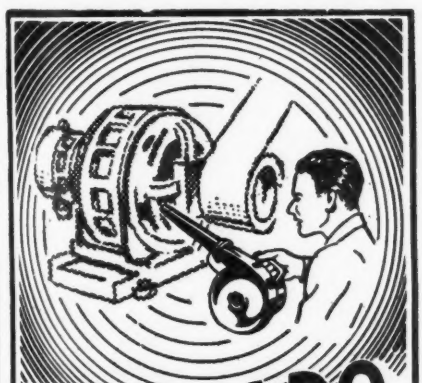
Poor & Co. has gained control of the Kensington Steel Co., Chicago, in which it has owned a substantial stock interest for many years. Kensington will continue under the same management: Eugene C. Bauer, president; Kenneth Jensen, vice-president; R. W. Sergeant, secretary-treasurer, and E. C. Anderson, sales manager.

Westinghouse Electric Corp. has arranged to purchase property and buildings from Talon, Inc., in Meadville, Pa., for the production of its entire line of industrial heating equipment, including many types of furnaces and other devices for heat-treating, dryers, immersion heaters, space heaters and thermostats. Shifting of this manufacturing from the East Pittsburgh (Pa.) works and the Mansfield (Ohio) plant of the electric appliance division will not affect total employment in either of these locations, according to L. B. McCully, manager of the transportation and generator division.

C. S. Johnson Co., Champaign, Ill., manufacturer of construction machinery and equipment, has appointed J. H. Heintz as general sales manager.

Armco Drainage & Metal Products, Inc., has moved the headquarters for its O'Neall Division from Chicago to South Bend, Ind. An office has been established in the St. Joe Bank Building and negotiations are being completed for a site to build a fabricating plant in South Bend.

Hewitt Rubber Corp., Buffalo, N. Y., has begun manufacture of a revised and improved line of industrial hose, with rearrangement of brands. Monarch is the new brand name for the top quality, or super grade, formerly identified as Maltese Cross; the new high grade is Ajax brand, and all utility or general-service hose is identified as Conservo. The "double-barreled" hose developed for the welding industry will continue to be known as Twinweld. P. J. O'Donnell Co., Inc., has been appointed Boston distributor to handle industrial rubber sales in eastern Massachusetts. A new Charleston (W. Va.) office has been opened by Hewitt and its subsidiary, Robins Conveyors, Inc. It will be headquarters for R. U. Jackson, of the Robins division, and Nelson J. Reinhold, who has joined Hewitt after serving 14 years with the Cincinnati Rubber Co. The staff also in-



TORNADO
PORTABLE ELECTRIC BLOWER
reduces
DUST DANGER

BLOWS clean, dry air, at 295 m.p.h. Cleans out motors, generators and hard-to-get-at places — removing dust, dirt, lint and chips. Costs less than 3c an hour to operate. Reduces damage to motors and bearings — lessens fire and health hazards.

1 H.P. universal G.E. motor. Weight, 14 lbs. Portable to any place in plant. Plugs in at convenient outlets. Adaptable as Sprayer for spraying paint and insecticide. Convertible into powerful industrial Vacuum Cleaner—for cleaning floors, walls, ceilings, etc.

Free Trial—Write to
BREUER ELECTRIC MFG. CO.
5098 N. Ravenswood Ave., Chicago 40

TORNADO

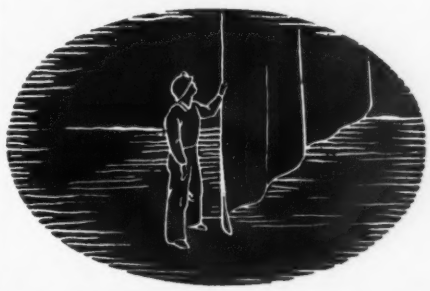
Give 'em AIR

Dad is in a particularly tough spot. Surrounded with bundles you can well imagine that he is having a difficult job breathing, what with his air supply cut off to a large extent.
Many mines have made sure that there will be no cut off of air supply by using

ABC
JUTE BRATTICE CLOTH

Use American Brattice Cloth—closely woven construction cuts air-leaks to a minimum—special chemical treatment renders it abrasion, flame, and rot-resistant. ABC can be moved easily—used over and over. Its surface is smooth, thus passing machinery or cars cannot pull it down or damage it. These features combine to assure proper ventilation at minimum cost—advantages that can be yours!

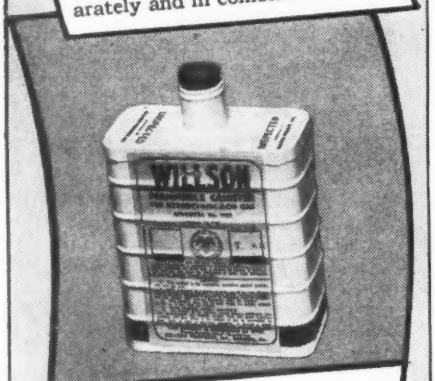
KEEP BUYING VICTORY BONDS



AMERICAN
BRATTICE CLOTH CORP.
WARSAW - INDIANA

Approved For Protection Against Industrial Gases

Give your workers reliable lung protection with Willson Industrial Gas Masks. Approved by U. S. Bureau of Mines. Seven different styles guard against specific hazards. Examples: ammonia, chlorine — other acid gases and organic vapors (separately and in combination).



Each style has its own special canister. Carefully tested for filtering efficiency, absorption quality. Other Willson features: non-fogging lenses, permitting unobstructed all-direction vision; snug-fitting all-rubber face piece.

For help with your lung protection problems, get in touch with your Willson distributor or write for further information.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

DOUBLE WILLSON PRODUCTS INCORPORATED

Established 1870

239 WASHINGTON STREET • READING, PA., U.S.A.

cludes H. N. Kepler, sales engineer formerly in the company's Washington office.

Chicago Pneumatic Tool Co., 6 East 44th St., New York City, has appointed Guy J. Coffey as vice president in charge of sales. Joining the company in 1933 as salesman in the Philadelphia branch, he was advanced to the Cleveland office and then to be manager of the West Coast office.

Babcock & Wilcox Co., 85 Liberty St., New York City 6, announces the retirement from active service of William Sheldrick, treasurer and assistant secretary of both the Babcock & Wilcox Co. and the Babcock & Wilcox Tube Co., and the appointment of W. G. Dryden as his successor. C. H. Clash has been appointed as assistant secretary, vice F. H. Holloway, resigned.

American Steel & Wire Co., subsidiary of the United States Steel Corp., has appointed C. H. Schiller as manager of market research and sales analysis. H. M. Ridlon has been named assistant manager of the same division. A. W. Ruttkamp, formerly manager, has been assigned special duties for the general manager of sales.

L. B. Keplinger has resigned as vice-president and director of the Rheem Mfg. Co. to become president and general manager of the Steel Shipping Container Institute, Inc., 570 Lexington Ave., New York City. J. Harold Merrick, general attorney for Rheem and recently made president of Rheem Mfg. Co. of Brazil, Inc., succeeds Mr. Kiplinger as vice-president of Rheem.

Dresser Industries, Inc., Cleveland, has appointed Roy A. Bass as director of distribution, a new post. This is the parent organization of 14 companies serving oil, gas and industrial markets and has 22 plants throughout the country. Before assuming this post he was Buffalo sales manager for Ross Heater & Mfg. Co., Buffalo.

Lincoln Electric Co., Cleveland, has named H. F. Kneen as vice president in charge of manufacturing and G. G. Landis as vice president in charge of engineering. Mr. Kneen joined the company in 1929 and became general plant superintendent in 1931. Mr. Landis entered the company's laboratories in 1924 and was promoted to chief engineer in 1930. Other appointments are: John A. Smithers as welding engineer in the Detroit area; W. L. Herbst as welding engineer at the Chattanooga (Tenn.) office; Harold H. House as welding engineer in the Moline (Ill.) area; L. B. Wallner as district welding engineer at Duluth, Minn., replacing I. R. Bartter, who was promoted to welding engineer at the company's Grand Rapids (Mich.) office; C. M. Burnett as welding engineer in the Boston area.

American Chain & Cable Co., Inc., Bridgeport, Conn., has acquired the business of the Certified Gauge & Instrument Corp., Long Island City, N. Y., whose principal product is a pressure gage with

PROTECT COAL CLEANING MACHINERY

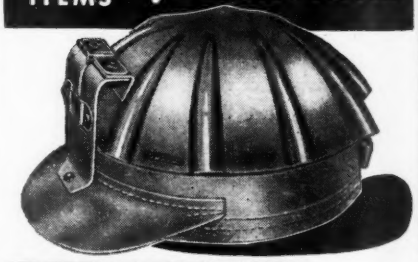
with DINGS MAGNETIC SEPARATORS

• Prolong the life of coal cleaning machinery with Dings High Intensity Magnetic Separators. Protect wet and dry coal preparation equipment permanently from costly tramp iron damage. Pulleys, drums, rectangular suspended magnets or any type unit furnished to fit your specific needs. Write today for helpful literature.

DINGS MAGNETIC SEPARATOR COMPANY
506 E. Smith Street
Milwaukee 7, Wisconsin

Dings HIGH INTENSITY

PORTABLE... SAFETY ITEMS for MINERS



PORTABLE COOL CAPS...

Arched head-piece construction for safety and comfort; flexo-band lining adjusts to any head size; rigid, strong, durable, comfortable.

BELTS...

With or without battery strap; 8-oz. grain bridle leather, heavy buckle 1¾ to 3 inches; also in Sam Brown style.

KNEE PADS...

Rubber, with embedded retaining straps; self-molds to any knee; very comfortable, durable.

Write, or phone Grant 1061 for complete information. Ask for catalog of safety items.

CHOICE TERRITORIES OPEN FOR LIVE DISTIBUTORS

PORTABLE SAFETY DIVISION
PORTABLE PRODUCTS CORPORATION
420 Blvd. of the Allies, Pittsburgh 19, Pa.

Engineered for Punishment!

● Building heavy-duty Off-the-Road Tires under war conditions . . . to do the same jobs as pre-war tires . . . developed and *proved* a new method of tire engineering at General.

"Shock Absorber" construction, General named it, because tire casings built this way stop shock concentrations . . . distribute heavy service loads and stresses uniformly . . . preserve the tire carcass for longer *original* service . . . more *recap* service.

More than just engineering excellence . . . General Off-the-Road Tires give you Top-Quality . . . stemming from quality control that extends from their own rubber and cord mills through to the finished tire. Generals are the tires delivering the lowest cost tire performance today!

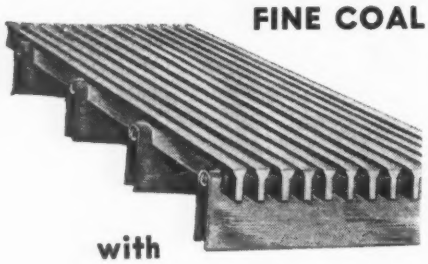
THE GENERAL TIRE & RUBBER CO.
Akron, Ohio

The GENERAL TIRE

GENERAL *OFF-THE-ROAD* TIRES

INCREASE PRODUCTION LOWER MAINTENANCE

SIZING and DEWATERING FINE COAL



with

The Profile-Bar

WEDGE-BAR SCREEN

with

Continuous Slot Openings Enlarging Downward

WEDGE-BAR means continuous slots. No cross wires, loops or non - perforated areas. Downward enlarging slots draw moisture and undersize from screen surface. U - Holder supports mean maximum carrying capacity and rigidity, minimum weight.

WEDGE - BAR Sections are specially designed and fabricated to do your job and fit your equipment for the most efficient screen performance and longest life. Our data sheets are available for your convenience in supplying data we need to make our recommendations — without obligation on your part. Write us.

Shaker Jackets • Vibrating Screen Panels • Chutes • Conveyors • Dryers

WEDGE-BAR SCREEN CO.

145 Hudson St., New York 13, N. Y.

a patented mechanism called the Helicoid movement. Manufacturing will continue at the Long Island City plant under the name Helicoid Gage Division, American Chain & Cable Co., Inc.

Wickwire Spencer Steel Co. has appointed L. R. Austin, Billings, Mont., as distributor of the company's wire rope in Montana, Wyoming and Idaho.

Cummins Engine Co., Columbus, Ind., has reorganized its sales department, creating two new sales divisions. Norman E. Palmer has been made general sales manager to work directly with Paris E. Letsinger, vice president in charge of distribution; J. D. Allen becomes sales manager of dealer organizations and Fred W. Sparks is sales manager of manufacturing accounts.

Joy Mfg. Co. has announced that an agreement has been concluded for acquisition of La-Del Conveyor & Mfg. Co., New Philadelphia, Ohio, chiefly through an exchange of stock. Operations will continue at the present plant site without interruption, the company name eventually being La-Del Division of Joy. Products of the two organizations effectively supplement each other. La-Del is a leading manufacturer of mine ventilating fans and portable mine blowers; also produces shaker and other mine conveyors widely used where geological conditions are unfavorable to the installation of Joy's larger and heavier mining equipment, particularly in anthracite mines. In addition, La-Del manufactures a high-pressure axial-flow fan of new design that has wide potentials in dust collecting, air conditioning, refrigeration, forced and induced draft heating, ship ventilation and other industrial uses. La-Del thus brings to Joy added coverage of the mining field, wider diversification of product lines and markets and some much-needed plant capacity. Commenting on the last-named factor, J. D. A. Morrow, president of Joy, pointed out that "Joy's plants at Franklin, Pa., are not large enough to accommodate all our manufacturing, and for some time past we have subcontracted a large part of our conveyor work. La-Del's plant can handle these jobs. Moreover, we are now in position to use the best features of Joy and La-Del engineering to produce a complete line of improved conveyors, superior to the present equipment of either company. At a future date, we plan to concentrate all our conveyor manufacturing at New Philadelphia." No change in management is contemplated at the New Philadelphia plant, it was further stated. Ivor Harris, president of the Ohio company, has expressed a desire to retire soon from active business, and A. L. Schwab will continue as La-Del's general manager, becoming the chief executive of Joy's new division upon Mr. Harris' retirement. Having completed a special assignment for the U. S. Government in Europe, Dr. T. H. Troller, developer and pioneer of the axial-flow-principle, has returned to his activities as consulting engineer of the La-Del Fan Co., division of the La-Del Conveyor & Mfg. Co.

B. F. Goodrich Co. has appointed James A. Windram as manager of the St. Louis district of the industrial products division. He succeeds George Livermore, district manager for the last three years, who is retiring from the company after 30 years' service.

Iron & Steel Products, Inc., Chicago, has appointed James C. Magee as manager of its machinery department, with headquarters in the main office. Charles A. ("Doc") Marshall has been named as sales engineer with headquarters in the general office.

Gar Wood Industries, Inc., has named Leon C. Hulse as manager of the company's new plant at Mattoon, Ill., which will fabricate road machinery and heavy-duty truck bodies. Formerly head of the termination department, he has been with the company since 1930.

•

Trade Literature

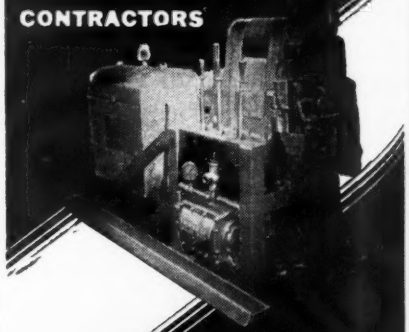
Coal-Coke Buckets—Hayward Co., 50 Church St., New York City. Bulletin 675 gives details about the Class E-15 grab bucket, of an improved design that is said to enable it to dig or rehandle one pound of coal or coke for each pound of bucket weight, with significant economies. Illustrations show the most modern methods in handling coal efficiently, and a chart gives bucket load capacities, weights and dimensions.

Power Equipment—Caterpillar Trac-

MOTT

DIAMOND CORE DRILLING

CONTRACTORS



Mott Type "A" Oil Hydraulic 1500 Ft. Cap. 2¾" Diameter Core.

• Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts . . . ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.

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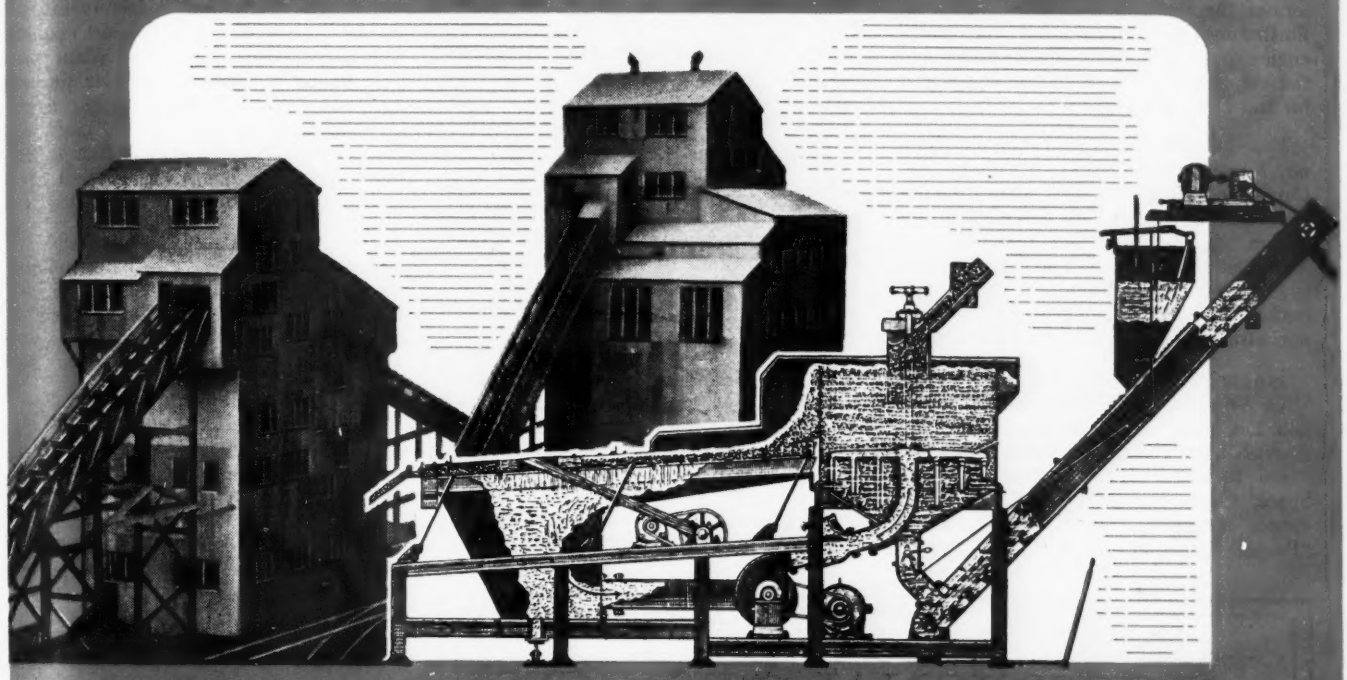

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Modernize Preparation Plants . . .

STEP-UP COAL CLEANING EFFICIENCY

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Peacetime demands for efficiency in coal preparation will continue no less urgent than those of wartime. That's why the outstanding records for economical operation made by Wilmot preparation plants and equipment are so significant to planners of post-war construction.

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"Wilmot Builds Better Breakers!"

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A Great Name in the Coal Industry

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tor Co., Peoria 8, Ill. Booklet Form 9002, titled "It Pays to Be a 'Caterpillar' Owner," discusses and pictures the benefits of Caterpillar ownership. Covering numerous fields and widely diversified operations, the new publication brings out graphically the benefits it cites. Bulletin Form 9106 describes the Caterpillar diesel D6 tractor, illustrating its features and the diesel engine that motivates it. Specifications and the complete line of matched equipment for the D6 are listed.

BRANCH PIPE OUTLET FITTINGS—Bonney Forge & Tool Works, Allentown, Pa. Catalog contains complete application information, structural data, installation procedure, specifications and list prices of Weldolet fittings for making full-pipe-strength permanent leakproof branch pipe outlets; also illustrates and describes drain-out fittings and complete line of flanges.

INDUSTRIAL WIRE CLOTH—Buffalo Wire Works Co., Inc., 443 Terrace, Buffalo 2. Catalog 12, containing data on industrial wire cloth, has these headings: "How to Order"; "Explanation of Mesh, Space, Gage, Percentage of Open Area, Proper Screen"; "Types of Weaves"; "Proper Selection of Metal"; "Special Weaves for Special Purposes"; "Finishing Services." Tables on all mesh sizes facilitate specifying and purchasing. Simple formulas permit users to work out their own measurements of open area, width of opening, weights, etc.

PUMPS—LaBour Co., Inc., Elkhart, Ind. Builetin 51 describes the Type G centrifugal pump, said to be an efficient vertical self-priming unit retaining and improving on all of the good features of older LaBour pumps, but entirely eliminating the contact type of seal.

INDUSTRIAL LOGISTICS—Elwell-Parker Electric Co., Cleveland. Booklet subtitled "A Survey for Management" explains how a planned system of materials transportation reduces costs in procurement, production and distribution of goods. Outstanding examples of economies are cited.

COAL PREPARATION — Westinghouse Electric Corp., East Pittsburgh, Pa. Bulletin B-3453 describes electrical equipment for coal preparation, with pictures of modern plants and equipment.

THREADLESS JOINT—Air Reduction Sales Co., 60 East 42d St., New York 17. Booklet ADG-2017 fully describes the Silbraz joint, the modern threadless connection that is said actually to bond I.P.S. copper tubing and brass pipe into a single one-piece pipeline. Profusely illustrated, the booklet shows how Silbraz joints are made from patented bronze pipe fittings, valves and flanges—containing a factory inserted ring of brazing alloy in each port opening. The manufacturer says that when brass pipe or I.P.S. copper tubing is properly inserted in these fittings and the assembly is brazed, the resulting joint is stronger than the pipe itself—a joint that is leakproof; that will not creep or pull apart under any pressure that the pipe itself can withstand.

ROLLER CHAIN BELTS—Baldwin-Duckworth Div., Chain Belt Co., Springfield 2, Mass. Bulletin 45-1 presents detailed description of roller chain features, with specifications of the more popular sizes and their list prices.

ARC WELDING—Lincoln Electric Co., Cleveland 1. Bulletin 416 describes the company's welding school, outlining the course and its advantages.

PORTABLE VACUUM CLEANERS—Allen Billmyre Co., 431 Fayette Ave., Mamaroneck, N. Y. Bulletin describes Exidust portable vacuum cleaners, said to be suited to the needs of almost every type of industrial plant. Dimensions, capacity, power, performance and weights are given for all models and sizes. Important characteristics such as advanced design of the vacuum producer, thorough dust separation and the easy maneuverability are explained.

DEGREE DAY MANUAL—Weston Dodson & Co., Inc., Bethlehem, Pa. Manual covering the subject of degree days and their application to the retail coal business contains charts and tables.

THAWING PITS—Hauck Mfg. Co., 124-136 Tenth St., Brooklyn 15, N. Y. Bulletin 1040 emphasizes the ease, economy and dispatch with which frozen coal in hopper cars can be thawed out through the use of thawing pits with low- and high-pressure air oil burners.

TRACTOR TOOLS—R. G. LeTourneau, Inc., Peoria, Ill. Bulletin Form G-1068 describes the full LeTourneau tractor equipment line, including various current models of carryall scrapers, tiltdozers, rooters, cranes and power-control units. Its many on-the-job illustrations show each type of equipment in different applications, which are accompanied by explanations of job-proved operating methods.

ELECTRODES—R. G. LeTourneau, Inc., Peoria, Ill. Reference chart—Form WT-111—Stresses the use of electrodes designed specifically for each type of welding job. Five types of Tournaweld electrodes, job-developed to serve all welding needs, are described—three special repair and maintenance electrodes and two general-purpose production-type weld rods. Listed with each type are its built-in characteristics and purpose, available sizes, distinguishing color and proper current for most efficient operation. Sketches illustrate typical applications.

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8 Points of Balance

1. Wide margin of strength.
2. Minimum inelastic stretch.
3. Uniform flexibility.
4. Maximum resistance to structural breakdown.
5. Smooth running.
6. Maximum traction.
7. High resistance to side wear.
8. Correct lateral reinforcement.

These 8 Points are correctly embodied in every Condor V-Belt. Other factors being equal, the useful life of a V-Belt is limited by excessive stretch.

Every Condor V-Belt has these 8 Points of Balance engineered into it — every Condor V-Belt is designed to give you more efficient power transmission, greater production and added profit through longer service life. And every Condor V-Belt does just that.

Stout, tough pre-stretched Whipcords carry the load smoothly, and are the Strength Members that fortify the FLEXLASTICS in which they are embedded. The FLEXLASTICS dissipate the heat of internal friction and high-speed flexing while providing a cushioned, smooth-running V-Belt.

Condor V-Belts are only one of the many MANHATTAN Products in which FLEXLASTICS, with engineered and correctly placed Strength Members, deliver added service. There are Paranite-G.O.P. Oil-Proof V-Belts with the same scientific principle embodied in their construction, but with G.O.P. FLEXLASTICS throughout for service where oil or excessive temperatures exist. The Non-Spark Feature for guarding against danger of fire, explosion and hazards from static is restricted but will be ready for your post-war use.

Write now for Condor V-Belt Bulletin 6868 B.

Condor Belts are now made in the dark, war-time color. The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

THE MANHATTAN RUBBER MFG. DIVISION

OF RAYBESTOS-MANHATTAN INC.

Executive Offices and Factories — PASSAIC, NEW JERSEY

When, where and why

SEALEDPOWER motors should be used in coal mines

WHEN—
You Require:

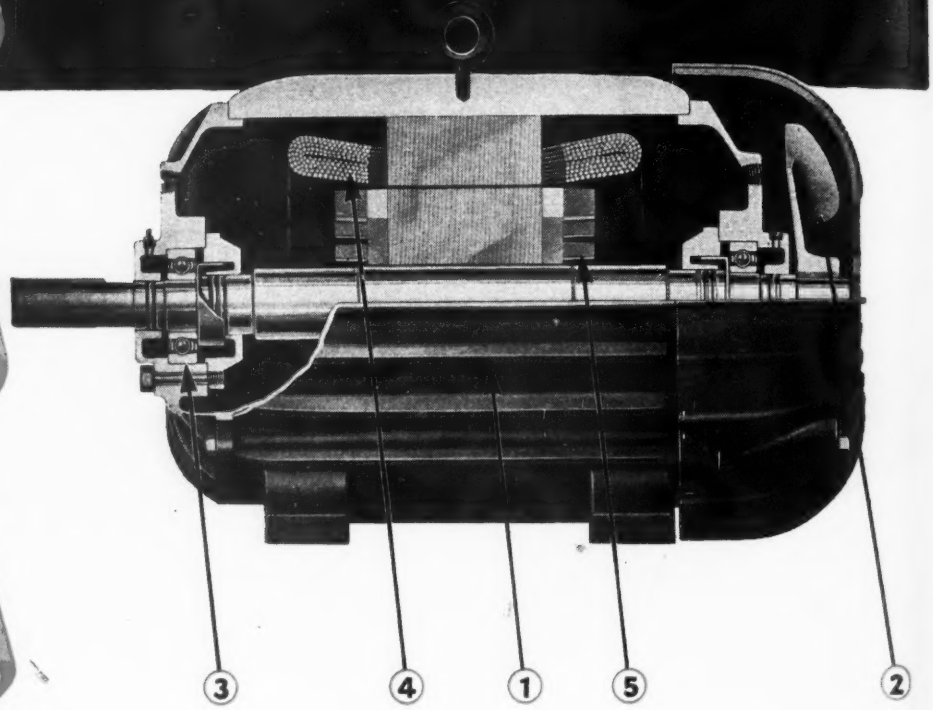
- Fans
- Blowers
- Pumps
- Compressors
- Conveyors
- Machine Tools
- Line Shafting
- Loaders

WHERE—
There Is:

- Dripping or Splashing Liquids
- Acid or Alkali Fumes
- Air-borne Moisture
- Steam
- Coal Dust and Dirt
- Metallic Chips

WHY—
Because:

- Low First Cost
- Minimized Maintenance
- Low Operating Costs
- Should need no Replacement Parts



The **SEALEDPOWER** a-c motor is right for all general purpose applications in the modern coal mine. The panels show when it should be specified . . . where it fits into modern mining . . . why it should be used.

An exclusive Crocker-Wheeler design, the **SEALEDPOWER** motor has a totally enclosed frame, (1) in illustration, that seals out coal dust and other foreign matter which would cause premature breakdown of insulation in a less well-protected motor. The motor is cooled by a large fan (2) which is safely enclosed in a cowl. This fan blows air *over the frame*, not through easily-clogged, hard-to-clean passages as is the case in conventional fan-cooled types.

Other design features include patented *Groovseal* bearings (3) which require regreasing only once a year, or even less frequently. Vacuum impregnated windings (4) reduce hot-spot temperatures and lengthen insulation life. The dynamically balanced *Alucast* rotor (5) is practically indestructible.

Why not ask the Crocker-Wheeler field engineer nearest you for complete details of this unique motor? Crocker-Wheeler builds a complete line of general purpose a-c and d-c motors for coal mine service . . . a-c from 1 to 10,000 horsepower, 208 to 2400 volts (or higher), 60 and 50 cycle, 3 and 2 phase . . . d-c from 1 to 5,000 horsepower, 115 to 550 volts. For prompt service and unbiased advice on the best motor for every application write or call the field engineering office nearest you.

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Low-set for wide vision . . .
Cool, well ventilated . . .

AO Duralite Goggles—sturdy yet lightweight—are equipped with impact resisting AO Super Armorplate Lenses that provide maximum possible protection from chips that come from *any direction.*

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AO Duralite Goggles have a one-piece adjustable headband that allows a secure yet comfortable fit, will not catch the hair, and is resistant to perspiration, oil, water and grease.

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Professional truck operators—whose vehicles deliver goods for the nation's business and industry—have but one source of income. That is *the earning power of their trucks.* . . . To meet competition and operate at a profit, professional operators *must* have trucks that combine efficiency and economy. Their trucks must have ample power—to move their loads speedily and smoothly. They must have dependability—to remain on the job day in and day out. *And—above all—they must be low in first cost, low in operating costs, low in maintenance costs.*

Chevrolet trucks provide these essential qualities in correct balance—no one quality over-developed at the expense of another, no one quality skimped. That is why so many professional operators choose Chevrolets . . . why Chevrolet trucks have led all other makes in sales in seven out of the last nine prewar years . . . why one out of every three trucks on the road today is a Chevrolet.

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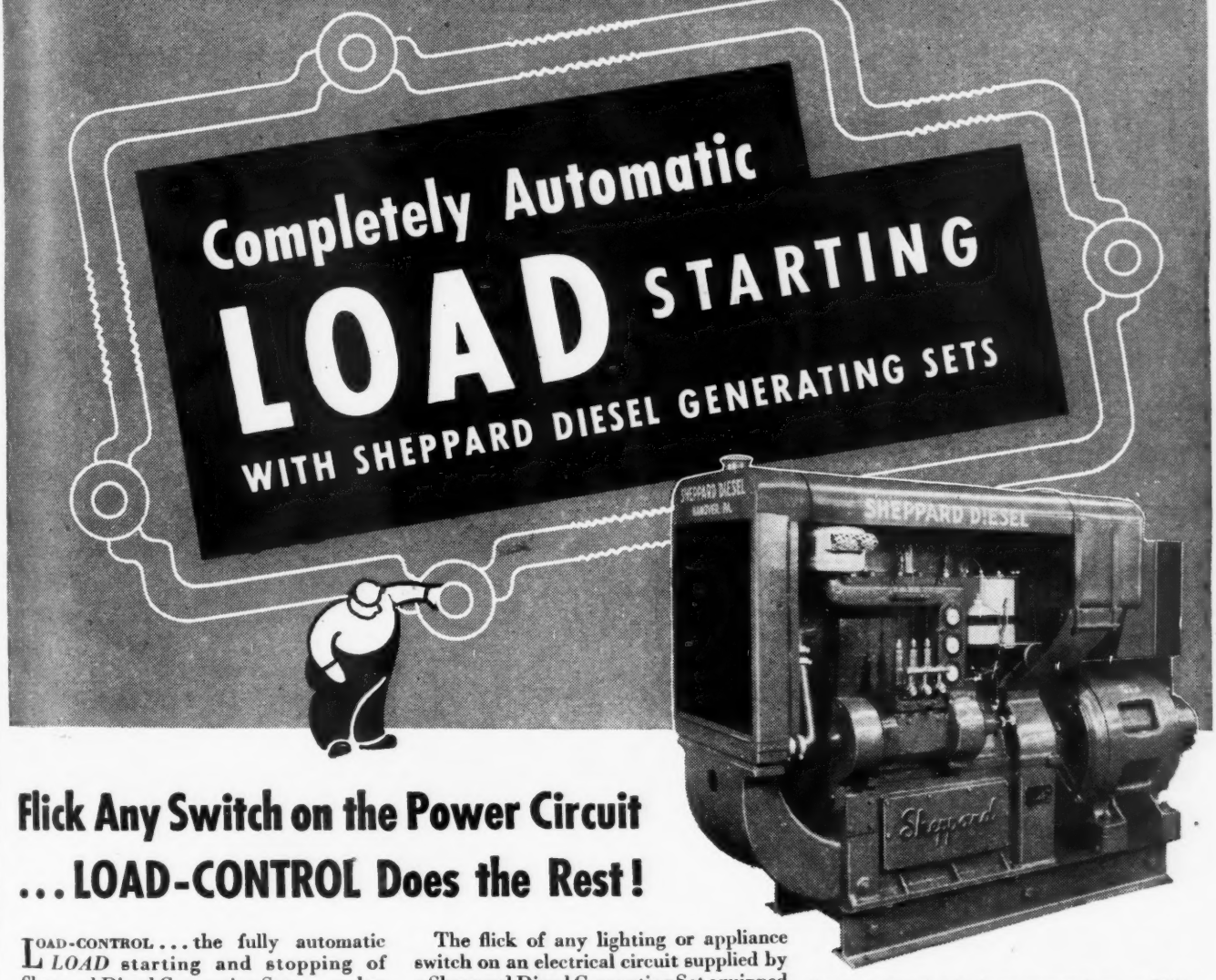
Completely Automatic

LOAD STARTING

WITH SHEPPARD DIESEL GENERATING SETS



Flick Any Switch on the Power Circuit ... LOAD-CONTROL Does the Rest!

LOAD-CONTROL ... the fully automatic *LOAD* starting and stopping of Sheppard Diesel Generating Sets ... makes it possible for operators to realize still greater power-cost savings than they are now enjoying. Because Sheppard LOAD-CONTROL cuts operating time of the power plant to periods when power is actually required, it reduces fuel consumption and prolongs the life of equipment.

LOAD-CONTROL is exactly what its name implies. The load demand on the power circuit controls the starting and stopping of the power source. The term—"automatic starting and stopping"—has been loosely applied to other control systems. However, these have been merely remote station control by a manual or thermostatic switch.

The flick of any lighting or appliance switch on an electrical circuit supplied by a Sheppard Diesel Generating Set equipped with LOAD-CONTROL will automatically start the generator. Power is instantly available. Turn off the switch and LOAD-CONTROL immediately stops the unit.

Sheppard LOAD-CONTROL requires no special wiring. Simply connect to present service leads. Available with any single or 3 phase AC Sheppard Diesel Generating Set. Mail coupon today for complete information about this exclusive feature.

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Sheppard Diesel Units are also available with:

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Sheppard Model 6A direct connected to an 18.7 KVA-AC 120/240 volt, 1200 RPM generator. This unit is equipped with LOAD-CONTROL. No special wiring is required ... just connect to present service leads.

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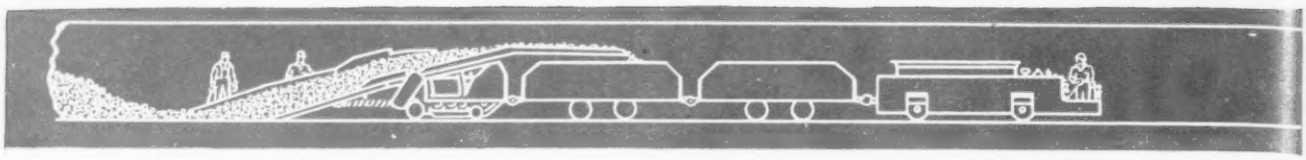
Name .....

Firm Name .....

Address .....

Load-Control ... the Phantom Engineer



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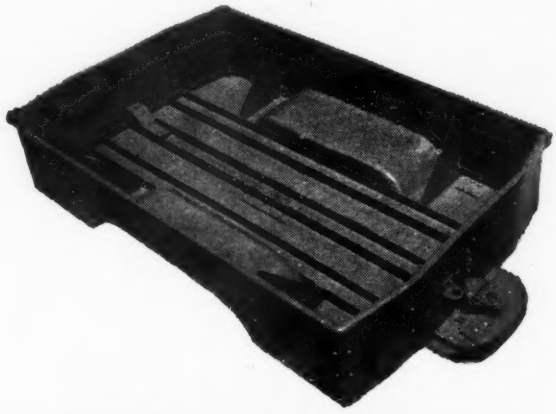

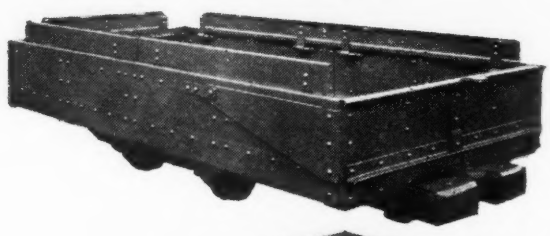

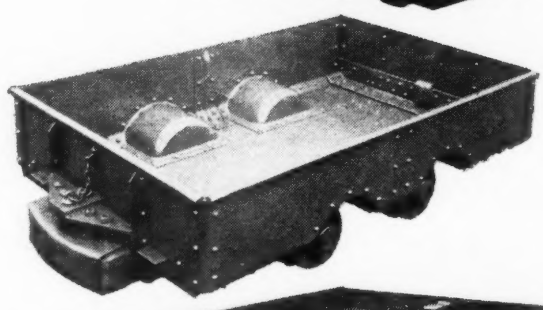

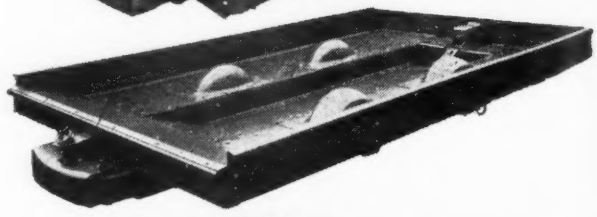

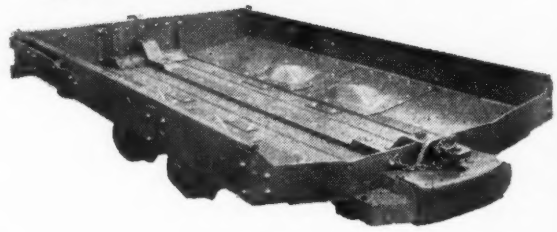

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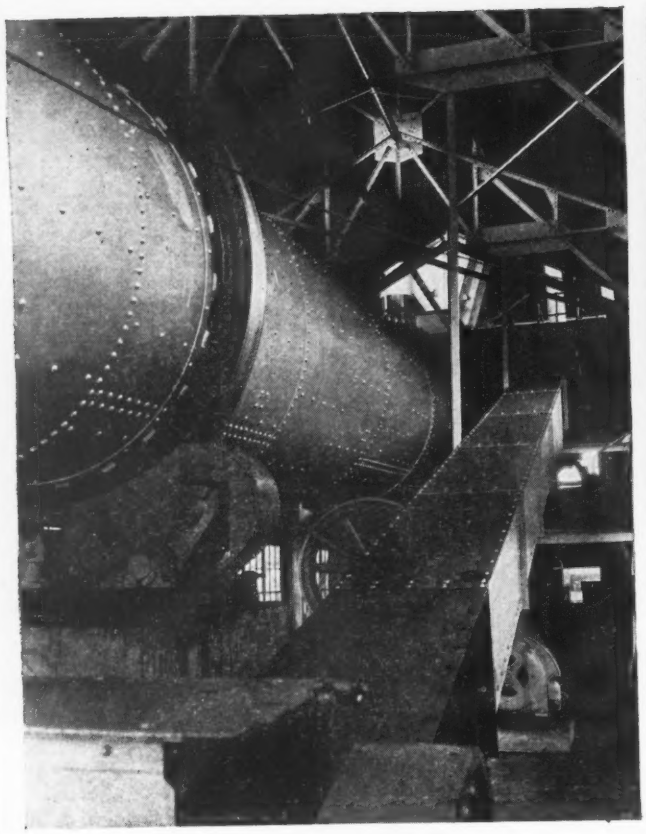

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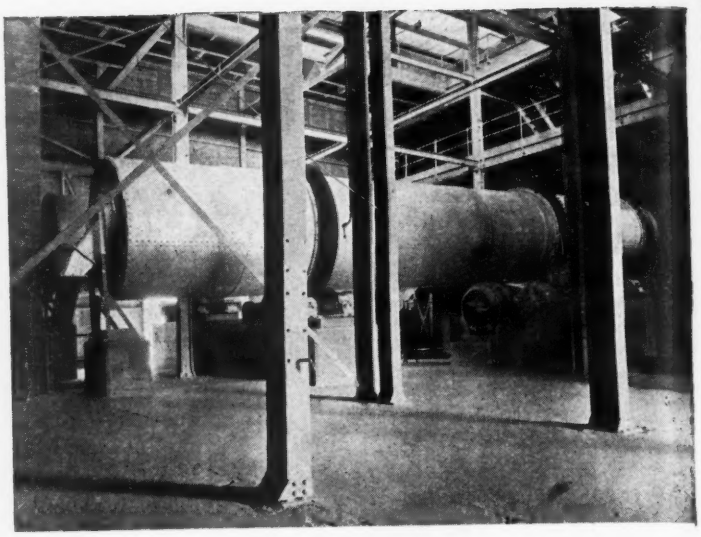

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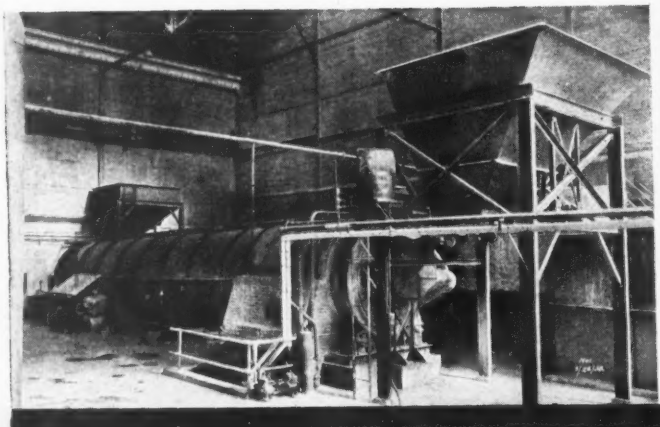

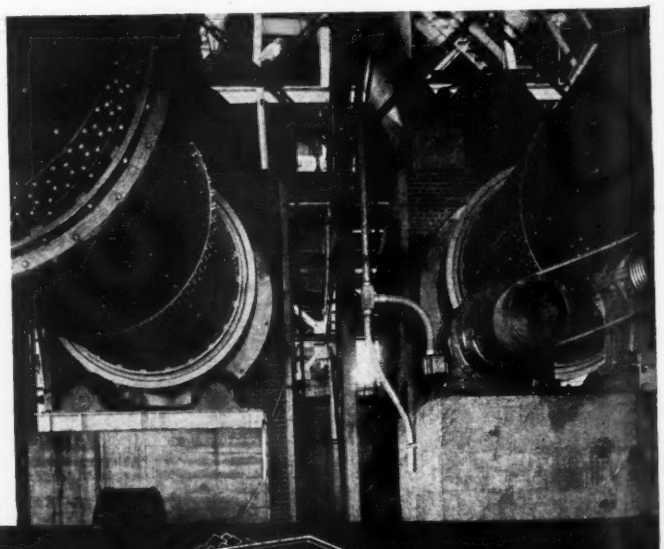

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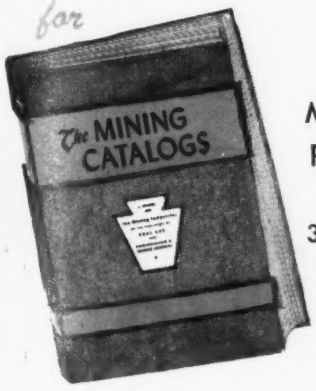

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THE MINING CATALOGS, 330 West 42nd St., New York 18, N. Y.

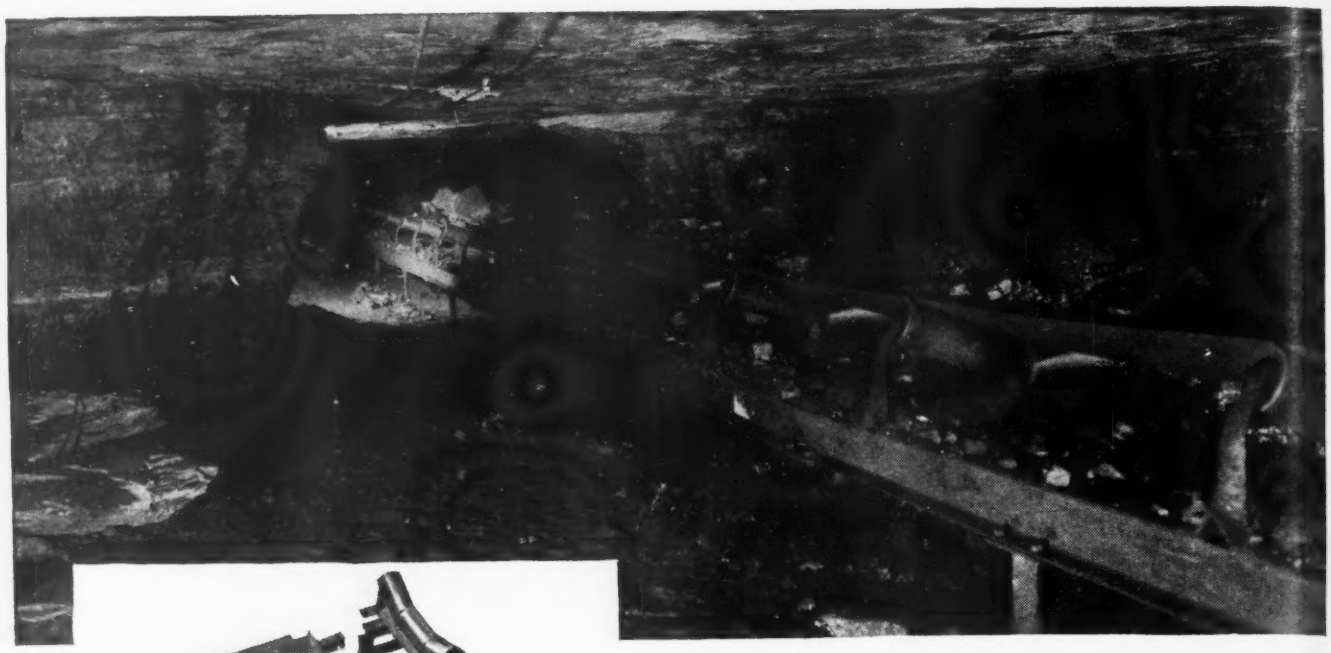
Gentlemen: I am responsible for specifying and requisitioning equipment and supplies needed at our property and do not have access to THE MINING CATALOGS. Please reserve a copy of the 1945-1946 edition for me. (If my country imposes a duty on such Catalog books, I agree to pay same).

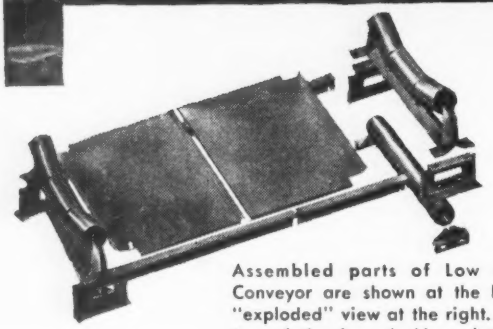
Name..... *Title*.....

Company Name.....

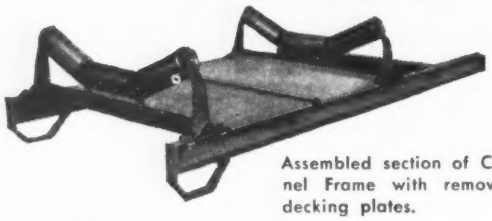
Company Address..... *State*.....

The nature of our operation is.....

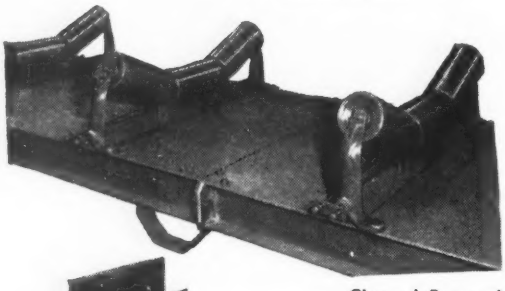




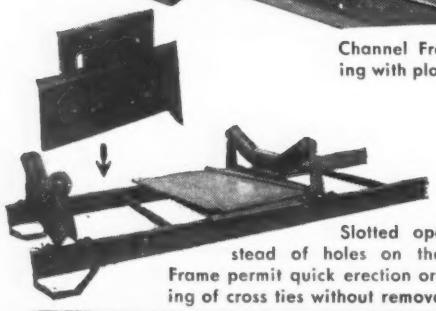
Assembled parts of Low Seam Conveyor are shown at the left — "exploded" view at the right. Only two of the four decking plates included in this illustration.



Assembled section of Channel Frame with removable decking plates.



Channel Frame decking with plates bolted.



Slotted openings instead of holes on the Channel Frame permit quick erection or dismounting of cross ties without removal of bolts.

WHY B-G CONVEYORS RENDER EFFICIENT, ECONOMICAL SERVICE IN RICHWOOD FIELD..

• *Variety* of *standardized* equipment is the answer. You can select Barber-Greene conveyor units best suited to the conditions in your mine . . . for the requirements of a system providing the most efficient haulage.

Here are only a few of the *pre-fabricated* B-G units of pre-engineered design that fit a particular spot.

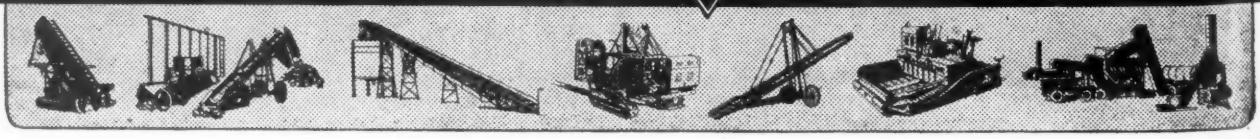
Barber-Greene's Low Seam Conveyor, for example, is built for frequent extension and moving. It's quickly and easily dismantled . . . can be transported by belt.

Each section of a B-G Channel Conveyor Frame is a self-contained unit. It's simple in construction, light in weight, low in first cost, and incorporates all those features essential to long belt wear.

Write to Barber-Greene's mining department for complete details on *standardized* underground conveying equipment. If you visit the Richwood coal field, West Virginia, be sure to see the Barber-Greene installations. Barber-Greene Company, Aurora, Ill.

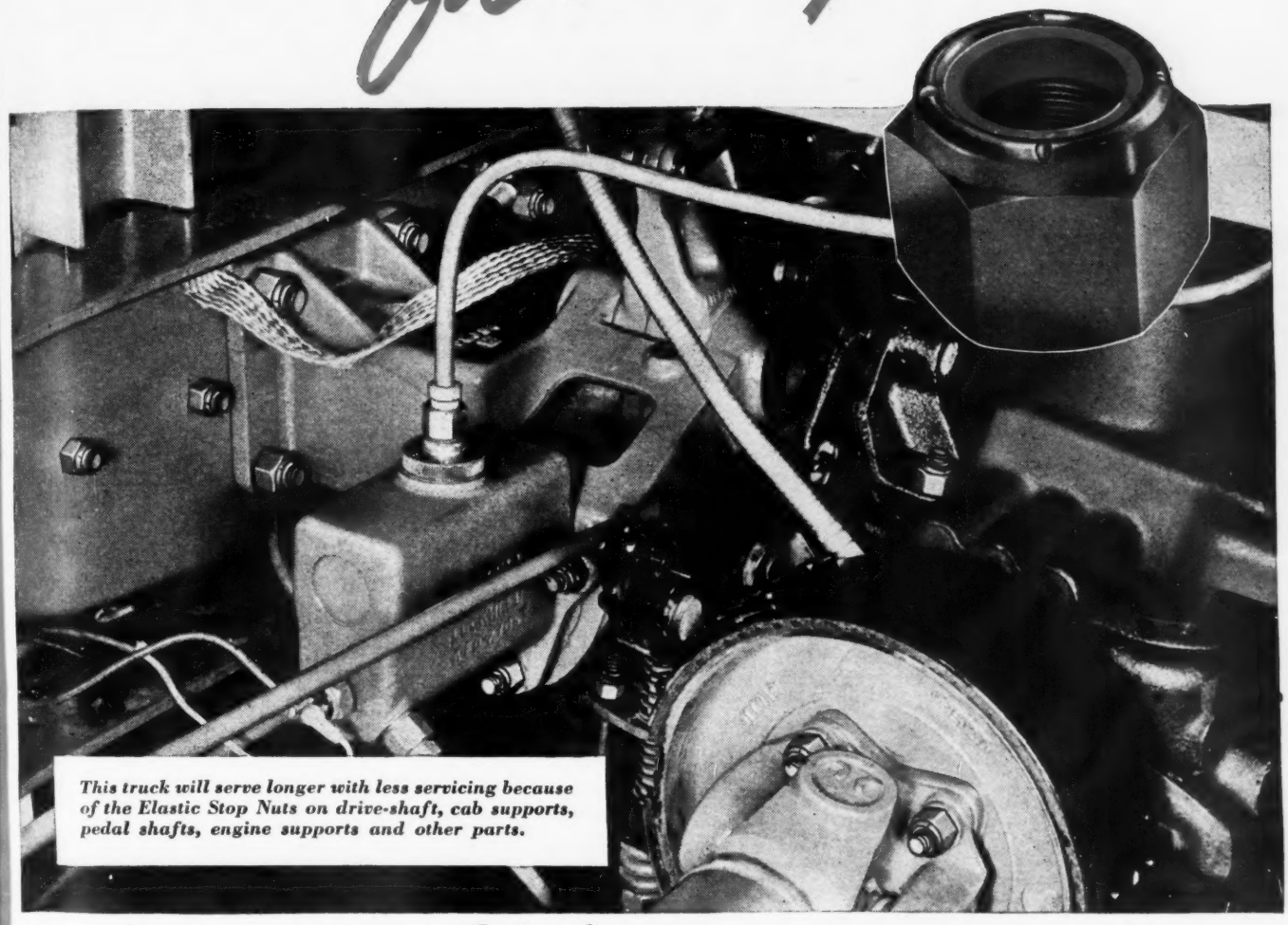
45-41

Barber-Greene B G *Constant Flow Equipment*



HERE'S THE HEADLINER

for holding power



This truck will serve longer with less servicing because of the Elastic Stop Nuts on drive-shaft, cab supports, pedal shafts, engine supports and other parts.

THE ELASTIC *Self-Locking* STOP NUT USES ITS HEAD

Making headline news among sales executives the country over is the Elastic Self-Locking Stop Nut, the nut with the famous red collar.

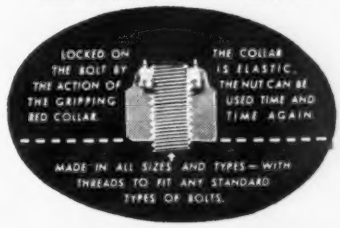
For sales executives are quick to recognize top-merit features that add sales appeal and widen public acceptance. The nut with the red collar, the hold-fast nut, adds value to trucks, passenger cars, vacuum cleaners, lawn mowers, radios and a host of other things because it assures longer, trouble-free service.

In industry, in the home, in office, factory and on the farm, red-collar nuts are finding thousands of new applications—holding fast wherever vibration, shock, impact or other loosening influences could cause trouble of any sort, from individual annoyance to multiple fatalities. They simply won't come loose. Not until you take a wrench and deliberately remove them. Then they turn off readily, for the metal threads are sealed-free of rust.

Tough and resilient, the red collar is unthreaded and gauged slightly smaller than the bolt. Bolt threads force their way in, do not cut, and a friction grip is set up. This overcomes the effects of vibration and other loosening forces—and because the collar retains its gripping power, the nuts may be used over and over again.

An application engineer will be glad to call on you and discuss ways Elastic Self-Locking Stop Nuts can help you.

LOOK FOR THE RED COLLAR
THE SYMBOL OF SECURITY

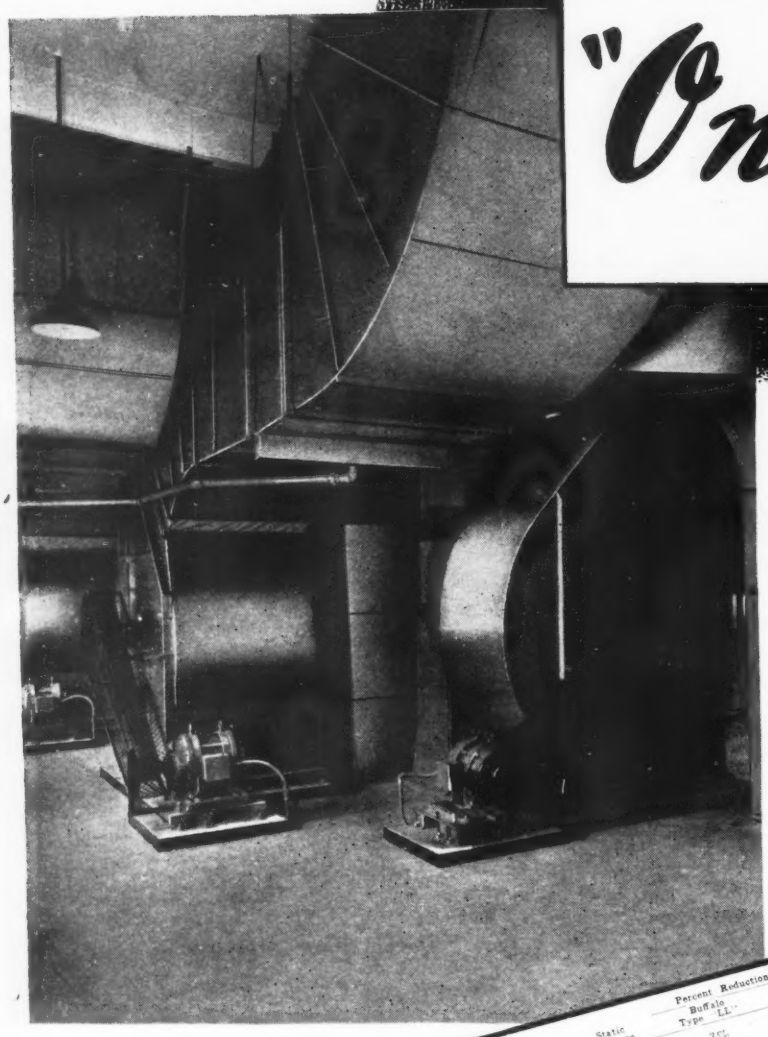

LOCKED ON THE BOLT BY THE ACTION OF THE GRIPPING RED COLLAR.
THE COLLAR IS ELASTIC. THE NUT CAN BE USED TIME AND TIME AGAIN.
MADE IN ALL SIZES AND TYPES—WITH THREADS TO FIT ANY STANDARD TYPES OF BOLTS.

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

Union, New Jersey

RATED PERFORMANCE "On the Job"



● Ventilating ducts *do not work* until the fan starts to operate! And—unless that fan gives you full rated capacity—your ventilating system may not come up to expectations.

Buffalo "Limit-Load" Fans not only measure up to standard code ratings—they *deliver* when the actual pressure conditions in the system vary from specifications.

The chart below gives comparisons which show how Buffalo Fans deliver MORE AIR on the job. Write for Bulletin 3339 for full details of construction.

Obstruction	Static Pressure	Percent Reduction in Capacity — Buffalo Type LL	Percent Reduction in Capacity — Competitive Forward Curve
Elbow on fan outlet	1"	3%	7%
	¾"	3%	7%
	½"	3½%	11%
Elbow on inlet from left side	1"	8½%	8½%
	¾"	2½%	11%
	½"	2%	17½%
Elbow on inlet from right side	1"	3%	5%
	¾"	1½%	6%
	½"	1½%	7%
Elbow on inlet from top	1"	2½%	3%
	¾"	2%	6%
	½"	3%	7%
Elbow on inlet from bottom	1"	1½%	5%
	¾"	1½%	6%
	½"	2½%	7%

"Buffalo"

BUFFALO FORGE COMPANY
147 Mortimer St.
Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

TYPE "LL" VENTILATING FANS

If you've had difficulty obtaining delivery of certain LaPlant-Choate models, please remember that dozers and scrapers continue to rate top priority as essential weapons of war. Moreover, again this year, LaPlant-Choate is producing more dozers for the armed forces than any other company in the industry.

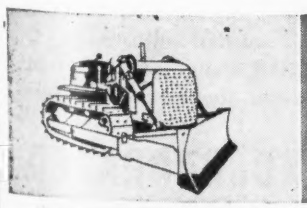
TRADE MARK

THIS MARK ON EQUIPMENT

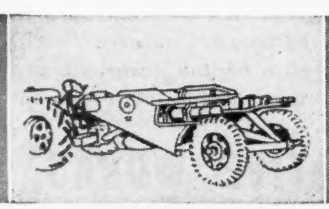
means Lowest Possible* Cost* on the Job*

Ask any of the thousands of satisfied owners who have used LaPlant-Choate equipment for years—and they'll tell you that you can't beat a LaPlant-Choate rig for saving time and money on the job. This LaPlant-Choate record of performance and economy—proved on tens of thousands of jobs the world over—will be even more evident in the new improved LPC earthmovers now being engineered for thrifty mass production after Victory. So before you buy any new earthmoving or land clearing equipment, be sure to look for the new LPC trademark. Backed by 34 years of *specialized* engineering and manufacturing "know-how", this new mark is your assurance of lowest possible cost per yard . . . per ton . . . per acre. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

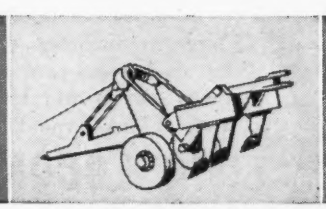
LAPLANT CHOATE
EARTHMOVING AND LAND CLEARING EQUIPMENT



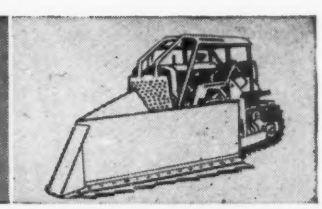
ALL TYPES OF DOZERS— Straight or angling blade, hydraulic or cable operated, for every size of track-type tractor.



LARGE OR SMALL SCRAPERS— Hydraulic or cable operated, front or rear dump, for use with your wheel or track-type tractors.



CABLE OPERATED RIPPERS— For ripping up hard ground, shale or concrete to facilitate loading with LPC "Carrimor" Scrapers.



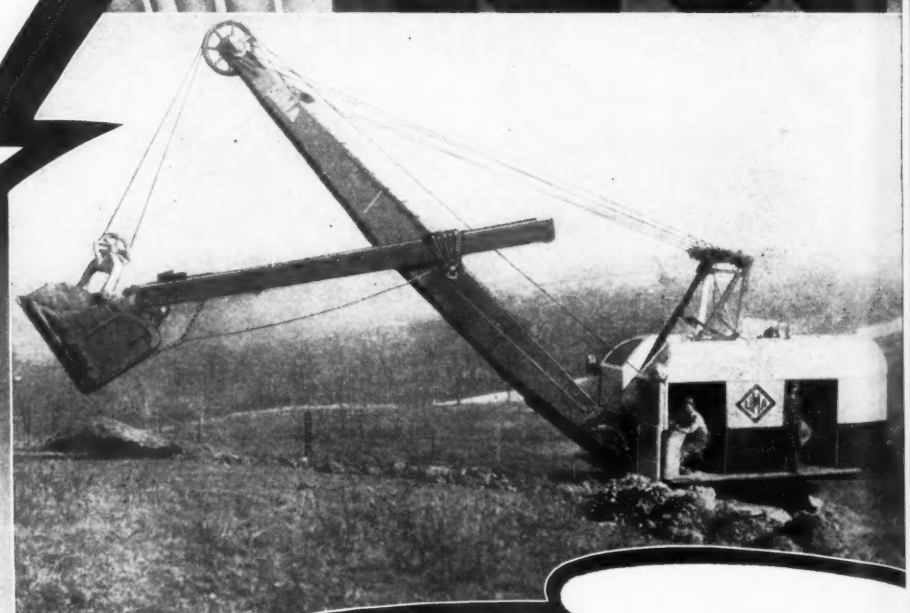
LAND CLEARING TOOLS—A complete line of Brush Cutters, Treedozers, Rootcutters and Brush Rakes—all are interchangeable.

LIMA

"Precision" Air-Control

type 1201

with



High-speed production is the keynote of this post-war construction era. Big output must be maintained hour after hour without operator fatigue. It is possible to meet this requirement with the LIMA Type 1201 shovel, crane and dragline because all principal operating clutches are controlled by air. The clutches are extra large in diameter, easy to operate, and are free from constant adjustment. If you need a 3½ yard shovel, a 65 ton crane, or a dragline, write for a copy of bulletin 121-B and learn more about the many advantages that are to be had with the LIMA Type 1201.

LIMA LOCOMOTIVE WORKS, INCORPORATED

SHOVEL AND CRANE DIVISION - - - LIMA, OHIO, U.S.A.

SHOVELS 3/4 YARD TO 5 YARDS | DRAGLINES VARIABLE | CRANES 13 TONS TO 100 TONS

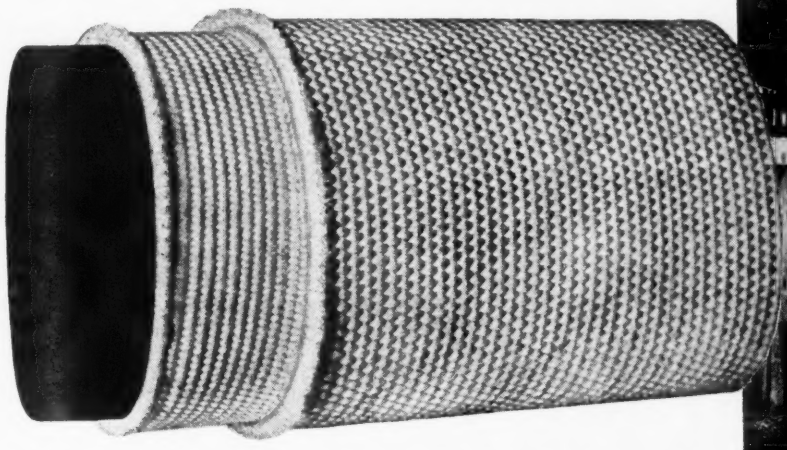
FIRE strikes swiftly!

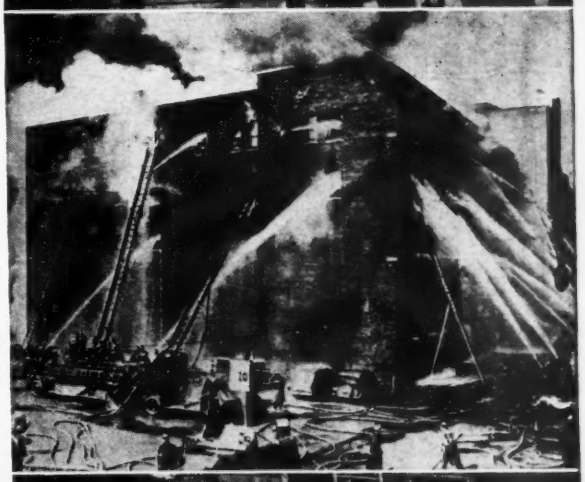
Every community, and every section of business: industry, mill or factory; all institutions, public and private; transportation companies, should check their fire fighting equipment, and the most important item of all is the Fire Hose.

QUAKER, during the war, manufactured millions of feet of Quality Fire Hose, and a large portion saw active service in many strategic points.

This dependable Quality Fire Hose is now available for all: city fire departments; industrial plants, mines and factories with their own Fire Departments; and those places where the volunteer fire fighting force acts as auxiliary until the city department arrives.

Whether you need 50 feet or 50,000 feet Quaker is ready to serve you promptly.





Better check your fire hose today. Then let Quaker supply you with their Quality Fire Hose for as many feet as you need to give you adequate protection.

QUAKER RUBBER CORPORATION

Mfrs Industrial Rubber Products

PHILADELPHIA 24, PENNSYLVANIA

NEW YORK • CLEVELAND • CHICAGO • HOUSTON

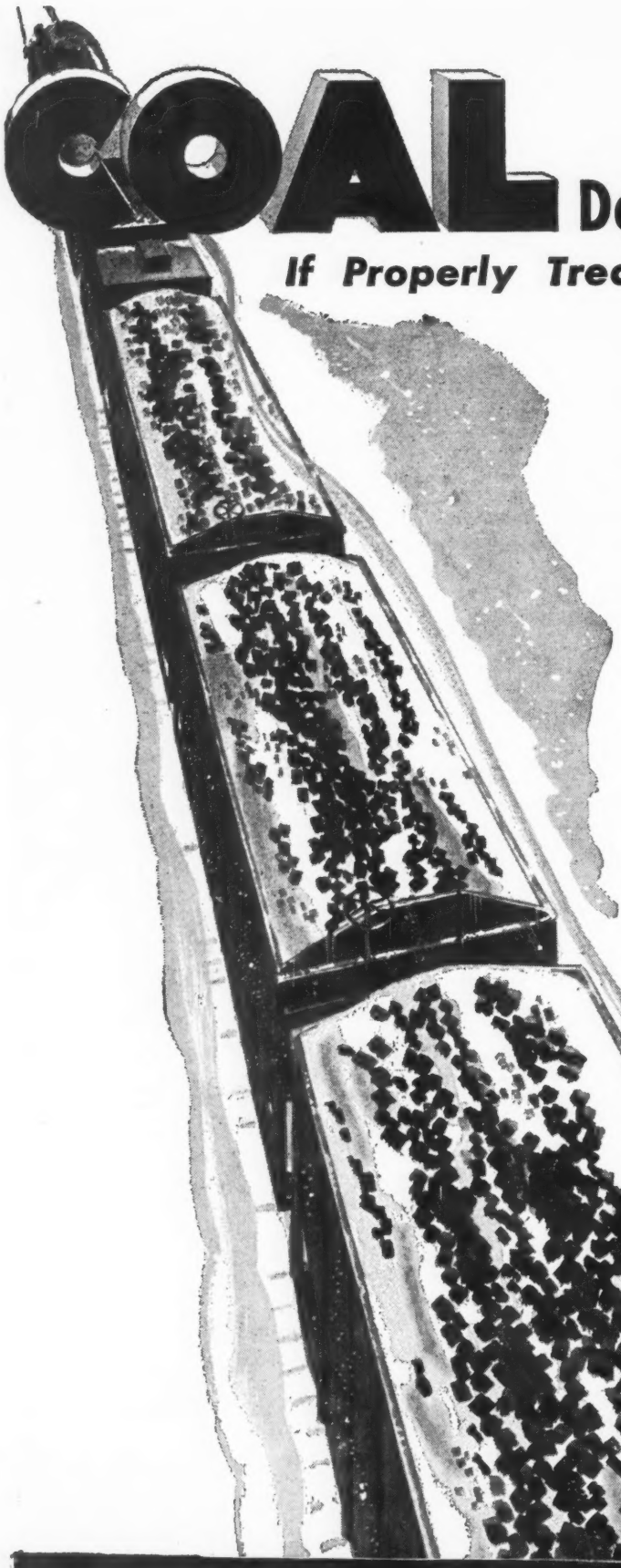
Western Territory

Quaker Pacific Rubber Company

San Francisco • Los Angeles

COAL Doesn't Freeze in Transit

If Properly Treated with Calcium Chloride



Mine companies tell us they don't have complaints of coal freezing in transit when they use the calcium chloride, double duty, Dustproofing-Freezeproofing treatment.

Time is coming when competitive fuels will make coal dealers hump to hold business. Proper dustproofing with clean, odorless calcium chloride is one of the best ways to develop customer good will.

And when you dustproof coal at the mines with calcium chloride you also prevent freezing—a double service which dealers need and have a right to expect right now when labor shortages and high wages make frozen coal an expensive nuisance.

Our Bulletin No. 37 will tell how to use this double duty treatment. Let us send you a copy—NOW.

CALCIUM CHLORIDE ASSOCIATION

4145 Penobscot Building **Detroit 26, Michigan**

FREEZEPROOF COAL AT THE MINES WITH

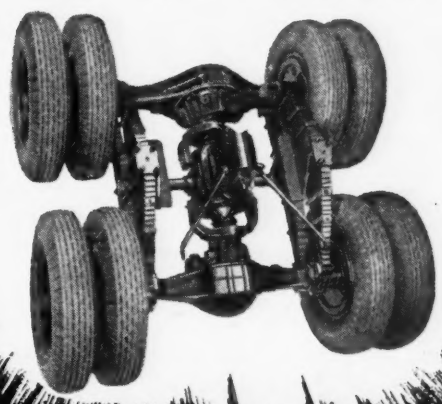
CALCIUM CHLORIDE

TRUCKING COSTS GO UP
PROFITS AND PERFORMANCE GO DOWN

When You Install THORNTON 4-REAR-WHEEL DRIVE

HERE IS THE UNIT

which converts a medium 1½ - 2 ton truck into a heavy duty, six wheel truck capable of hauling 8 to 10 tons payload. Delivered complete with 8 new tires. No priorities or WPB release required.



The truck which consistently hauls its loads at the lowest cost is the greatest profit maker. This is the real reason for the big increase in the number of trucks equipped with Thornton Drives. As a typical example:

*A fleet operator selected two standard 1½ ton trucks and equipped one of them with a Thornton Four-Rear-Wheel Drive. He operated both trucks for one year on the same contract. The standard truck could work only 204 days due to bad weather and road conditions. This truck earned a net profit of only 14%.

As compared with this, the Thornton equipped truck worked 251 days, an extra 47 days gained because Thornton's *two* driving axles and 100% greater tractive effort enabled it to operate on soft ground that stopped the standard truck. Also the Thornton unit hauled 100% more payload on each trip. After paying for the equipment and all expenses, the owner had a net profit of 112%.

Today this owner's trucks are all equipped with Thornton Four-Rear-Wheel Drives.

*Name furnished on request.

HERE IS WHAT IT DOES:

- Carries 100% more payload even under toughest conditions.
- Out-pulls, out-lasts, out-maneuvers standard trucks costing double or more.
- Its two-speed gear case provides 100% greater tractive effort or rim-pull.
- Gives better springing. Thornton's walking beam type of spring suspension insures equal load distribution between the two driving axles.
- Six wheel brakes assure greater safety.
- Saves tires . . . gasoline . . . oil . . . wages and time.

GET THE FACTS, AND YOU, TOO, WILL LEARN REAL TRUCKING ECONOMY

The heart of the Thornton Drive is the exclusive Thornton Automatic Locking Differential which gives both axles positive drive and differential action without "Axle Fight".

EVERY
THORNTON 4-Rear-Wheel DRIVE
INCORPORATES A
THORNTON Locking DIFFERENTIAL
ALSO AVAILABLE FOR TRUCK AXLES

Thornton Tandem Co.

8701 Grinnell Avenue, Dept. 65, Detroit 13, Michigan, U.S.A.

Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

Name_____

Address_____

City_____ State_____

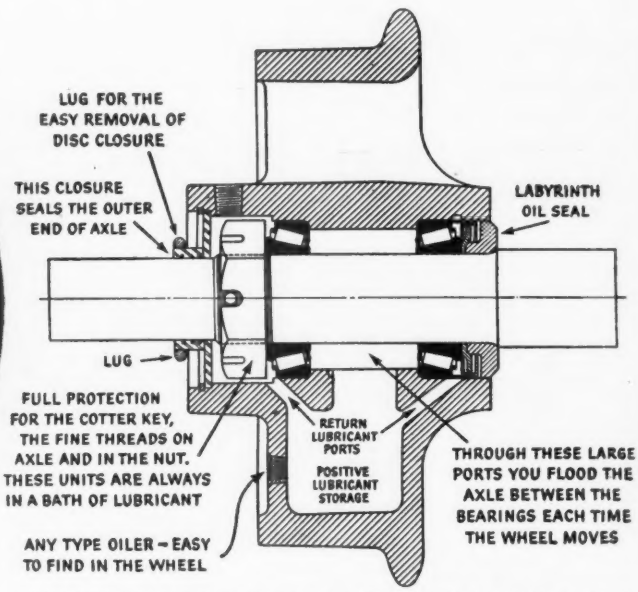
Make of Truck_____ Year_____

Used for_____

A NEW OILSPOK WHEEL

. . . for 4-AXLE CARS

Both Ends Sealed . . .


LUG FOR THE EASY REMOVAL OF DISC CLOSURE
THIS CLOSURE SEALS THE OUTER END OF AXLE
LABYRINTH OIL SEAL
LUG
FULL PROTECTION FOR THE COTTER KEY, THE FINE THREADS ON AXLE AND IN THE NUT. THESE UNITS ARE ALWAYS IN A BATH OF LUBRICANT
RETURN LUBRICANT PORTS
POSITIVE LUBRICANT STORAGE
THROUGH THESE LARGE PORTS YOU FLOOD THE AXLE BETWEEN THE BEARINGS EACH TIME THE WHEEL MOVES
ANY TYPE OILER – EASY TO FIND IN THE WHEEL

THE WHEEL WITH THE BUILT-IN LUBRICATION SYSTEM

Each Oilspok storage has 3 ports—one large *central* port and two rectangular ports situated at the outer end of each bearing. The lubricant flows readily through the large central port between the bearings. This then passes through the rolls and is again thrown back through the outer rectangular ports by centrifugal force to the storage reservoirs where it cannot be lost.

The performance and cost-saving advantages of Oilspok wheel automatic lubrication are now available to owners of 4-axle cars. This new stub axle Oilspok wheel with its continuous, free-flowing, positive lubrication is designed with nut end completely sealed by a disc closure which protects the fine threads in the nut and on the axle. The nut, axle end and cotter key *are always in a bath of oil*. The labyrinth seal effectually prevents loss of lubricant at the flange end of the wheel hub.

The disc closure (shown above) forms a seal over the axle, preventing leakage of the lubricant up to the line of the axle. The disc is of cold rolled sheet steel and is machined on its outside diameter for slip fit, which makes an oil tight seal. Two lugs, welded to an extension collar on the disc, make it easy to remove when necessary.

The construction of Oilspok storage reservoirs with thin walls forming their sides, provides for uniform chilling of the entire wearing tread. This adds strength to the wheel and assures longer life.

Oilspok 4-axle car wheels are made for both standard and labyrinth enclosures. Wheels can be made spoke type, single or double web as desired.

Save wheel costs, and prepare for post-war operations by installing Oilspok wheels now. Write for full information.

HOCKENSMITH WHEEL & MINE CAR COMPANY
Established 1877, Penn, Pa., Phone Jeannette 700.

OILSPOK'S 7 ECONOMIES

1. Increased wheel life. Excessive tread wear is eliminated by the free-flowing lubrication.

2. Saves power. Free wheel rotation means no power lost by churning grease. Lubricant in "Oilspok" wheel is fluid and free-flowing.

3. Saves lubricant and lubricating labor. "Oilspok" lubrication is positive and continuous—no loss due to pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.

4. Longer bearing life. Bearing lubricant is constantly changed—bearings clean and cool—constant circulation—no replacements.

5. Increased axle box life. "Oilspok" wheels are free turning under all temperature conditions.

6. Especially Efficient in Small Diameters. Small diameter wheels for heavy loads increase the friction necessary to move them with grease lubrication. Oilspok wheels with positive circulating lubrication provide a freer running car, saving bearings.

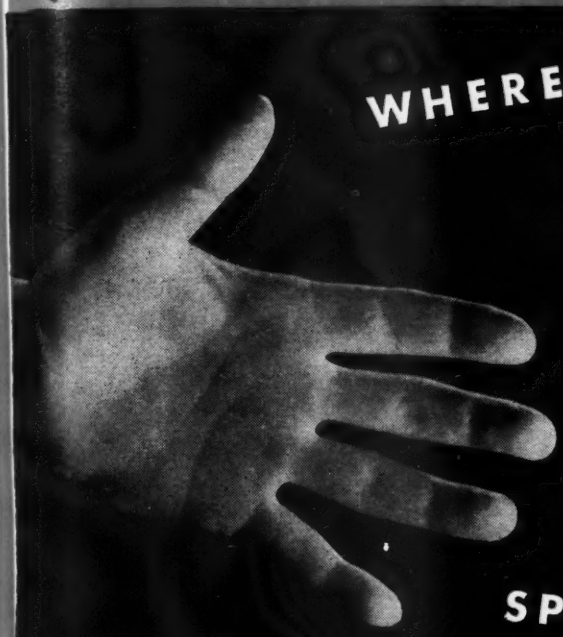
7. Stronger wheel—no extra weight. "Oilspok" wheels have tapered box section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing sizes.

This Oilspok wheel can be furnished for use on your present equipment.

Hockensmith *"Oilspok"* Wheels

Also Builders of All Types of Hydraulic Dump Bodies, Penn Telescopic Hoists and Industrial Cars

At Your Finger Tips...



WHERE TO BUY

SIZES AND WEIGHTS

PERFORMANCE DATA

ENGINEERING SERVICES

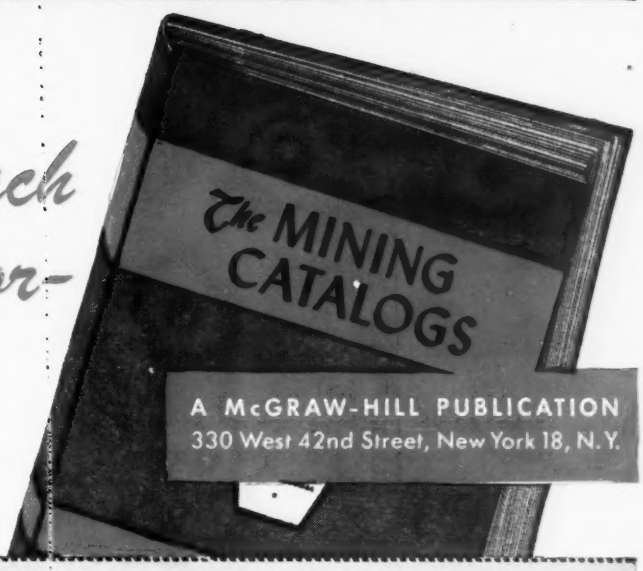
SPECIFICATIONS

On Mining Machinery, Equipment and Supplies

WHETHER it's a crusher, some bearings or a reel of wire rope that you're going to buy for your company, look it up in *The Mining Catalogs*. The information you get in *The Mining Catalogs* is up-to-date, concise but complete, and easy to locate quickly. Manufacturers have condensed their complete catalog information to speed up your search.

10,000 men responsible for specifying or requisitioning are using *The Mining Catalogs* regularly. It makes those jobs easier. Be sure you are on the list to receive your copy of the 1945-1946 edition . . . send the coupon today.

Reach for—



THE MINING CATALOGS, 330 West 42nd St., New York 18, N. Y.

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Name..... *Title*.....

Company Name.....

Company Address..... *State*.....

The nature of our operation is.....

HYDROTARDER SAVED $100 PER MONTH ON BRAKES ALONE

If you're operating trucks in hilly country or on off-the-road jobs where braking is a problem—the Parkersburg Hydrotarder is the answer to your troubles.

For example, one operator's figures on two installations on logging jobs in British Columbia show the Hydrotarder is saving $100 per month, per truck, on brakes alone. In addition there are less obvious but equally important savings on oil, gas, tires and wear and tear on engines and transmissions. The same operator also gives high praise to the extra safety the Hydrotarder provides. He says, in part, "It makes it impossible for a truck to get out of control on the steepest grades."

On another logging job the brake linings on a Hydrotarder-equipped truck showed less than one-eighth inch wear after a whole season. Other trucks on the same job were ready for their fourth brake relining job.

Write today and find out what the Hydrotarder can do towards licking **your** braking problems.

One of many logging trucks operating with greater safety, economy and speed as a result of being equipped with Parkersburg Hydrotarder.

Parkersburg
HYDROTARDER

THE PARKERSBURG RIG & REEL COMPANY
PARKERSBURG, W. VA.

Manufacturers since 1931 of the famed Hydromatic Brake—the load retarder which makes possible the drilling of deep oil wells safely and economically. Its counterpart, the Hydrotarder, enables motor transportation to operate with greater safety, economy, and speed than was ever heretofore believed possible

Distributed by

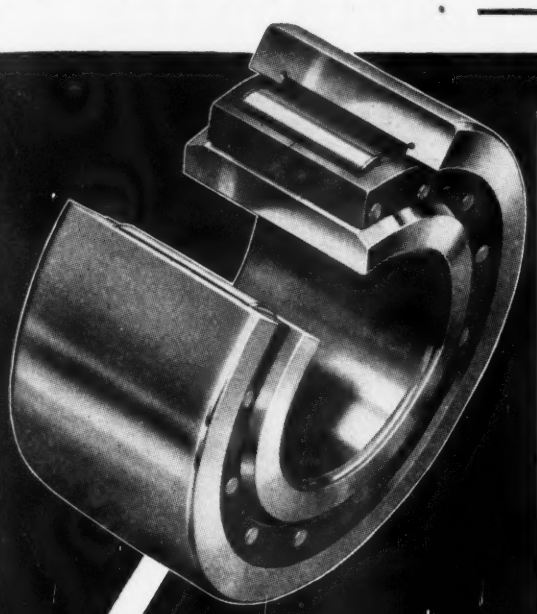
HETZEL BROTHERS
Engineers and Manufacturers
1972 Los Angeles Street, Los Angeles 11, California

THE WINTER-WEISS COMPANY
22nd and Blake Sts., Denver 2, Colorado

The Pointer-Willamette Company
238 N. E. Oregon St., Portland 14, Oregon

BEARING CAPACITY

for tomorrow's heavier machine loads...



ROLLWAY RIGHT-ANGLE LOADING

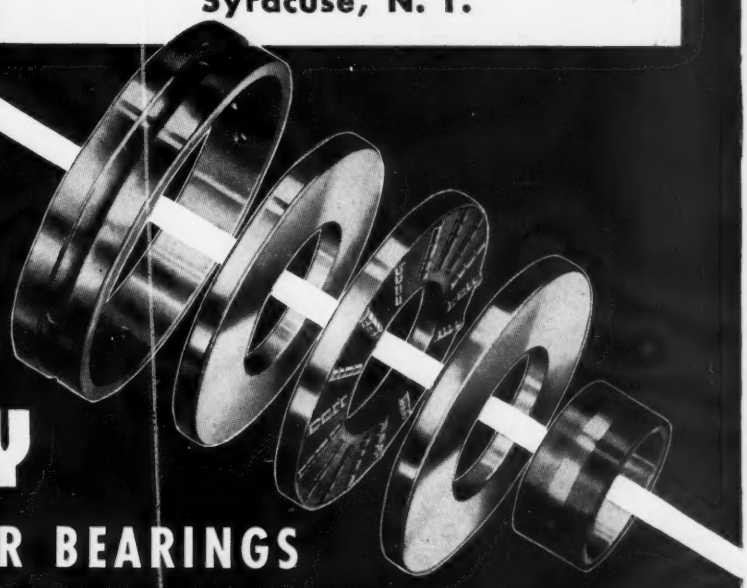
Change to Rollway Right Angle Loading

In the drive for postwar production . . . for competitive advantage in postwar markets . . . machines will be pushed to new limits. Bearings which served reasonably well under war conditions will now lack the freedom from service attention, the life expectancy, the load capacity required for satisfactory operations on new peacetime output.

That's when it will pay to change to Rollway Solid-Cylindrical Roller Bearings. Bearings that give you more metal to carry the load . . . longer line contact with the race . . . and lower unit pressures. Rollway Right-Angle Loading splits compound loads into the two components of *pure radial* and *pure thrust* . . . carries each of these on separate roller assemblies. Total load magnitudes per bearing are lower, and are carried perpendicular to the roller axis. There are no oblique resultants, no complicated stresses, no tendency for the rollers to pinch out from between the race. The result . . . less rubbing friction, less roller-end wear back.

ROLLWAY BEARING CO., INC.
Syracuse, N. Y.

Find out today how Rollway Right-Angle Loading can improve your bearing performance. Just send a print of your assembly with specification of load, speed and type of service for confidential analysis and recommendation. No charge. No obligation.



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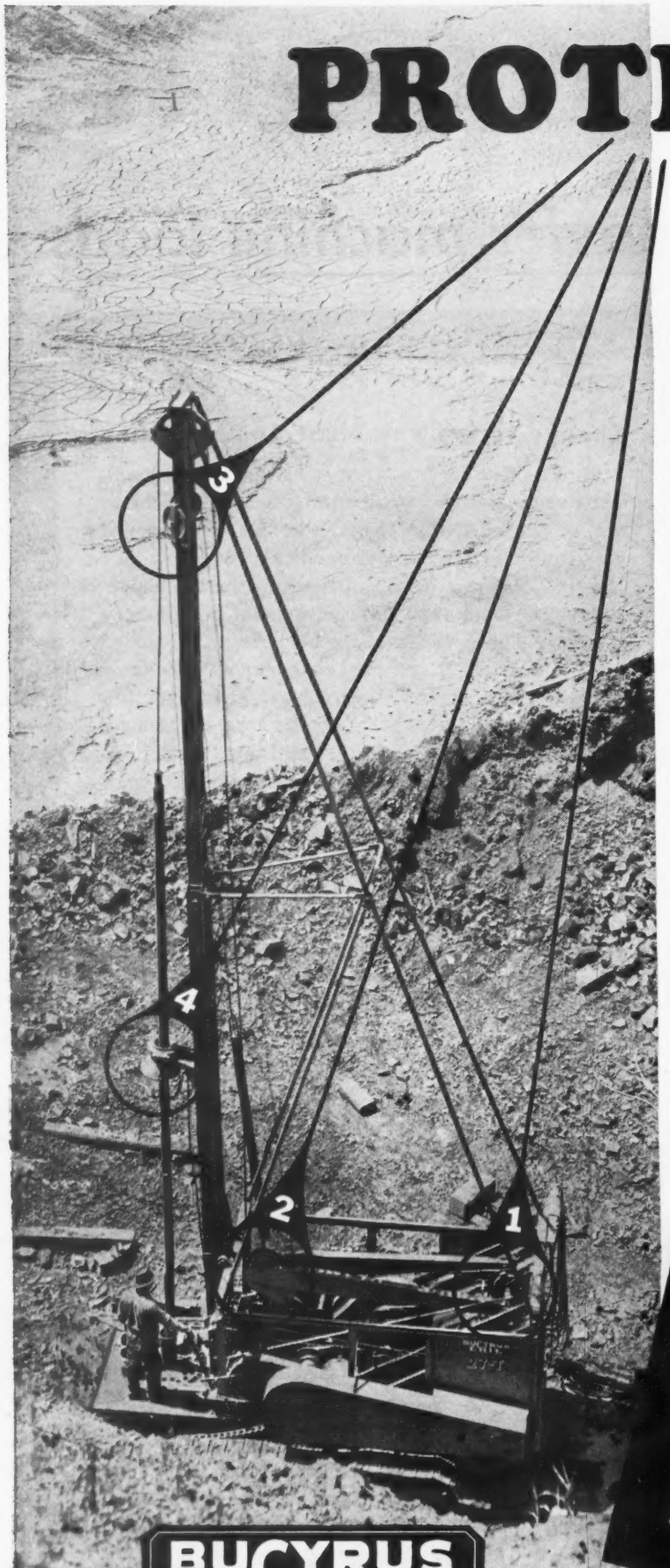


PROTECTION

that cuts maintenance and line costs

It's effective application of power that gives Bucyrus-Erie blast hole drills outstanding footage-efficiency, but it's defense against shock that does so much to keep maintenance and line costs low. The critical points — where the drill line comes in contact with the machine after impact of tools — are rubber insulated to absorb the shocks of drilling: (1) at the heel sheave, (2) at the spudding beam sheave, (3) at the crown sheave. At points (1) and (2), insulation consists of live rubber rings mounted on the hubs of the sheaves. Protection at the crown sheave (point 3) is obtained with a rubber shock absorber—a series of rubber rings separated by steel plates and mounted between the sheave guide and a cross member on the derrick. In addition (point 4), all tool guides (except on Model 22-T) are equipped with live rubber rings to absorb shocks involved in guiding tools. With these critical points protected, the shocks and vibrations that ordinarily cause high maintenance and line deterioration are reduced to harmlessness. The result to you is a big saving in drilling: steady high footage at low per-foot cost.

It will pay you to investigate these models

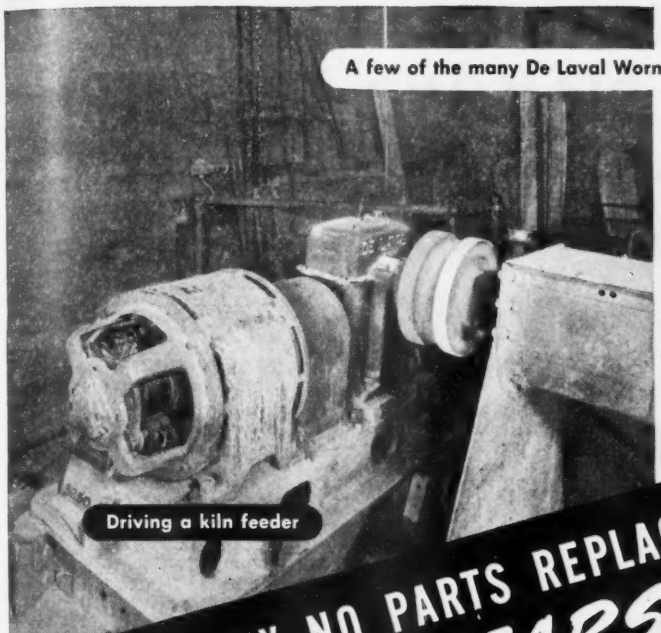
22-T for 5-5/8" to 6-5/8" holes
27-T for 6" to 6-5/8" holes
29-T for 9" holes
42-T for 9" to 12" holes

5845

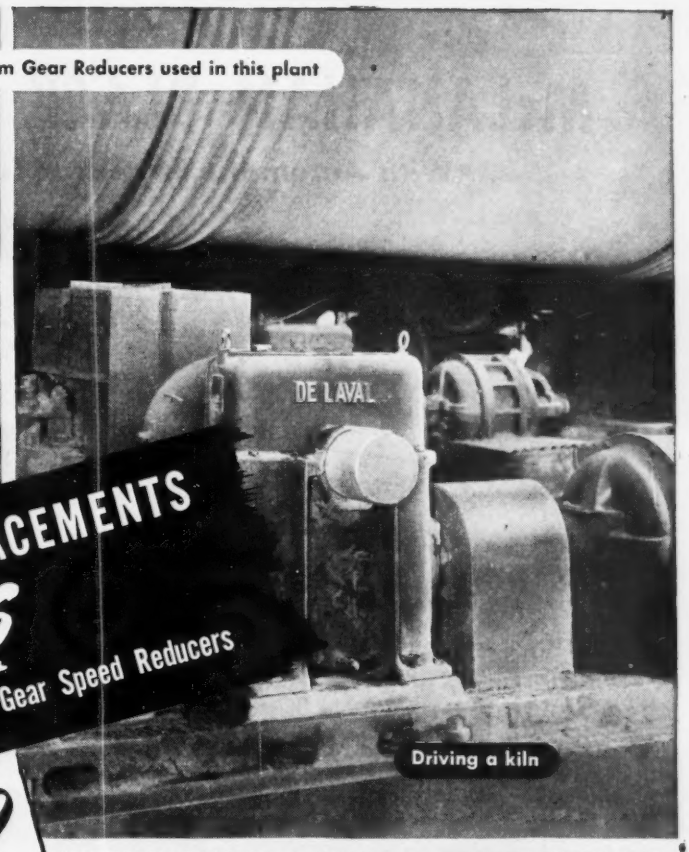
BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

A few of the many De Laval Worm Gear Reducers used in this plant



Driving a kiln feeder



Driving a kiln

PRACTICALLY NO PARTS REPLACEMENTS in 19 YEARS

Reported by Plant Employing Many De Laval Worm Gear Speed Reducers

How's that for Reliability?

De Laval Worm Gear Speed Reducers have given such good service in a certain cement mill (name furnished on request) that the Plant Superintendent has written of their performance:

"There are about 175 reducers of various sizes in operation in this plant on a wide diversity of jobs; and during the last eighteen or nineteen years, since the original ones were installed, we have had to make practically no replacements of worms, wheels or bearings. In fact, there has never been any interruption in production by reason of the failure of a speed reducer."

For reliable, trouble-free service under severe conditions, specify De Laval Worm Gear Speed Reducers.

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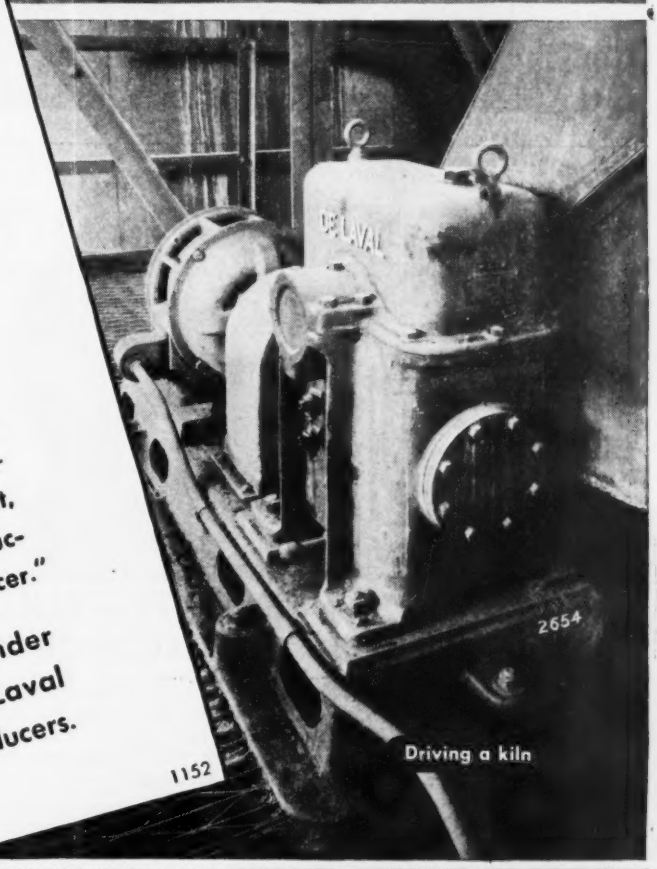

Driving a kiln

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DE LAVAL

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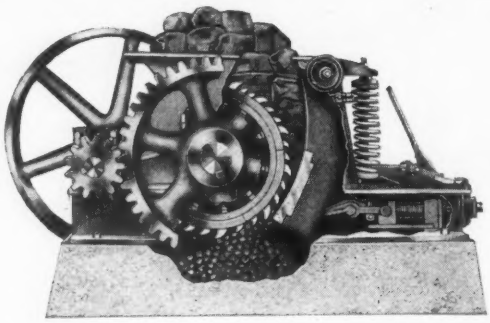

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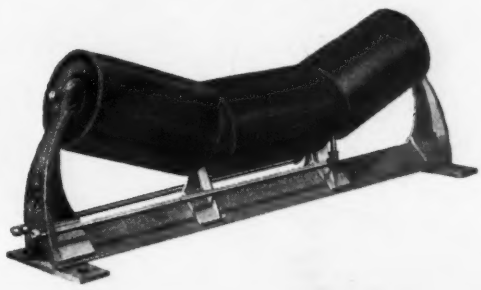

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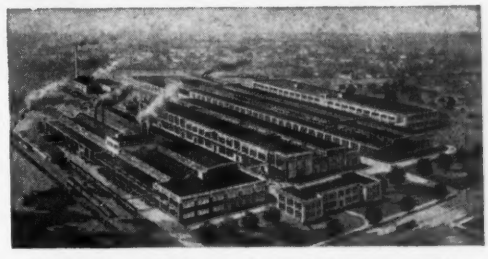

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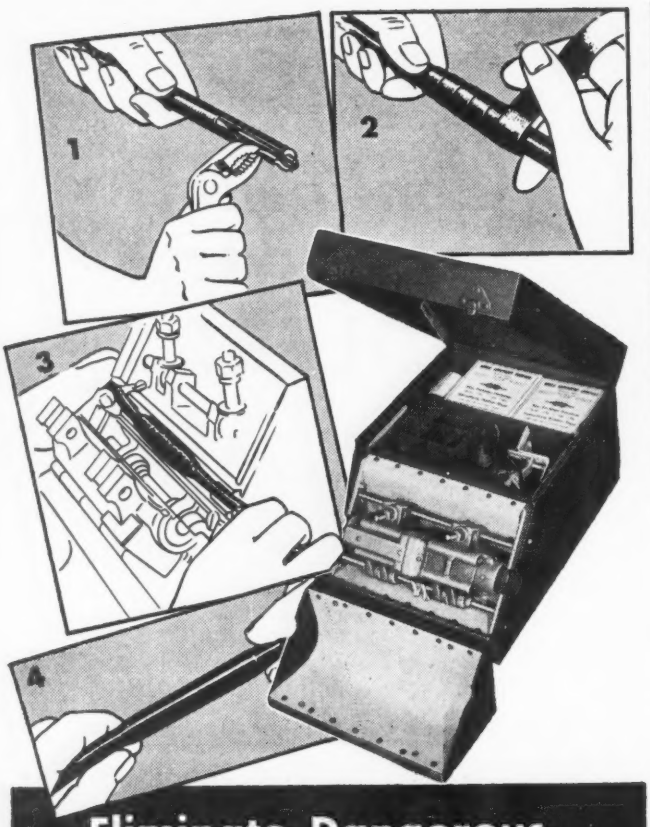

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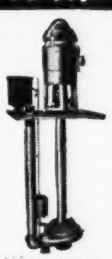

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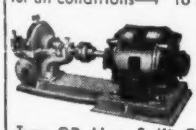

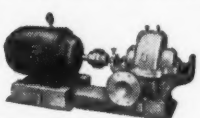

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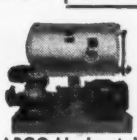

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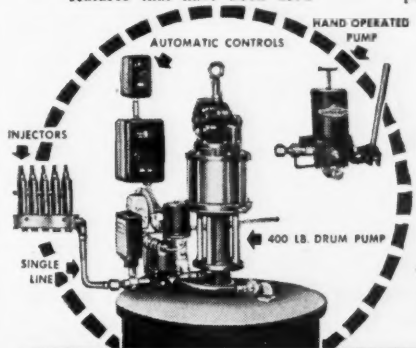

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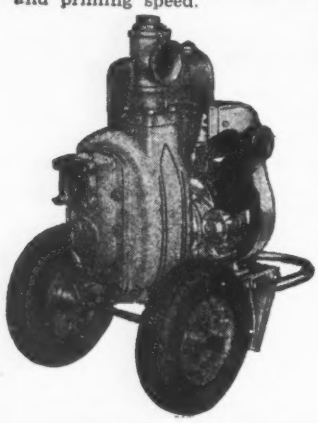

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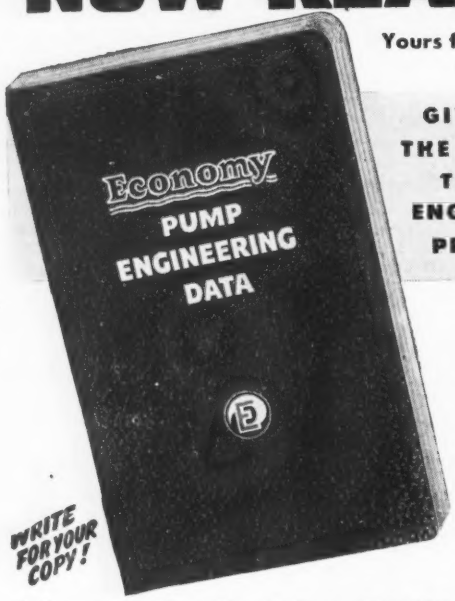

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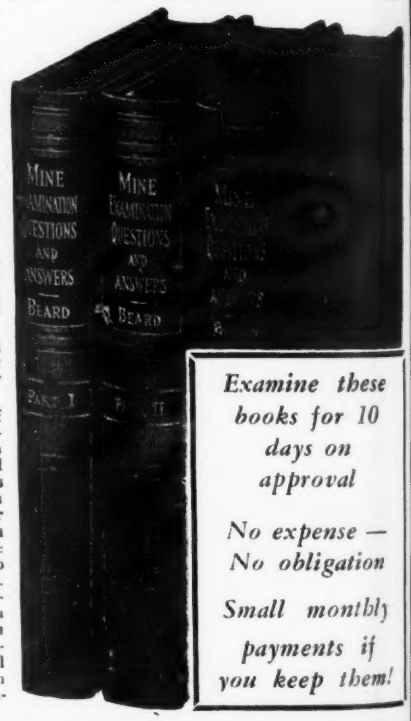

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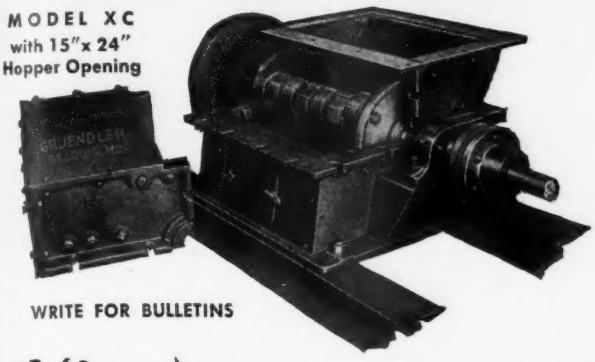

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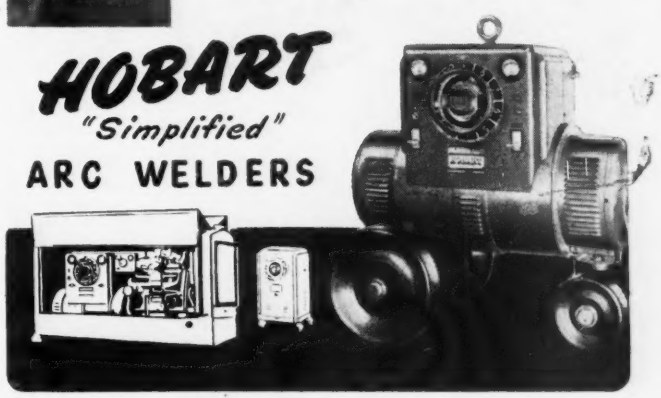

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Textile World.

For advertising rates or other information address:
Departmental Staff
McGRAW-HILL PUBLISHING CO., INC.
330 W. 42nd St., New York 18, N. Y.

Dustproof and Freezeproof your Coal with Dowflake *TODAY* so you will get your share of Business *TOMORROW* when Coal must compete with other fuels!

THE DOW CHEMICAL COMPANY
MIDLAND MICHIGAN
New York • Boston • Philadelphia • Washington • Cleveland
Detroit • Chicago • St. Louis • Houston • San Francisco
Los Angeles • Seattle

DOWFLAKE CALCIUM CHLORIDE 77-80%

Now—MATCH THEIR BEST WITH YOUR MOST IN THE VICTORY LOAN!

Top off your good work on your Payroll Savings Plan with an outstanding showing in the Victory Loan—our last all-out effort!

Help bring our boys back to the homes for which they fought—and give our wounded heroes the best of medical care—by backing the Victory Loan! You know your quota! You also know by past war-loan experience that your personal effort and plant solicitation are required to make your quota.

Sell the New F.D. Roosevelt Memorial $200 Bond through your PAYROLL SAVINGS PLAN!

In rallies, interdepartmental contests, and solicitations, promote the new Franklin Delano Roosevelt Memorial $200 Bond! Better than "cash in hand," Victory Bonds enable the buyers to build for the future—assure a needed nest egg for old age.

Keep on giving YOUR MOST to the Victory Loan! All Bond payroll deductions during November and December will be credited to your quota. Every Victory Bond is a "Thank You" to our battle-weary men overseas—also a definite aid in making their dreams of home come true! Get behind the Victory Loan to promote peacetime prosperity for our returning veterans, your nation, your employees--and your own industry!

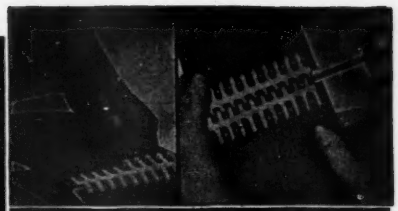
The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

VICTORY LOAN

This is an official U. S. Treasury advertisement prepared under auspices of Treasury Department and War Advertising Council

BELT LACING and FASTENERS for transmission and conveyor belts



"JUST A HAMMER TO APPLY IT"

ALLIGATOR

Trade Mark Reg. U. S. Pat. Office

STEEL BELT LACING

World famed in general service for strength and long life. A flexible steel-hinged joint, smooth on both sides. 12 sizes. Made in steel, "Monel Metal" and non-magnetic alloys. Long lengths supplied if needed. Bulletin A-60 gives complete details.

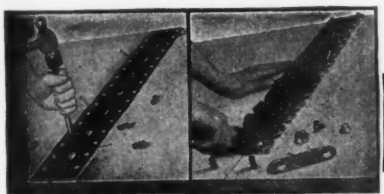
FLEXCO HD

BELT FASTENERS AND RIP PLATES

For conveyor and elevator belts of all thicknesses, makes a tight butt joint of great strength and durability. Compresses belt ends between toothed cupped plates. Templates and FLEXCO Clips speed application, 6 sizes. Made in steel, "Monel Metal", non-magnetic and abrasion resisting alloys.

By using Flexco HD Rip Plates, damaged conveyor belting can be returned to satisfactory service. The extra length gives a long grip on edges of rip or patch. Flexco Tools and Rip Plate Tool are used. For complete information ask for Bulletin F-100.

Sold by supply houses everywhere



"CONVEYOR BELTS EASILY FASTENED"

FLEXIBLE STEEL LACING CO.

4638 Lexington St., Chicago, Ill.

POWER MUST BE PROPERLY CONNECTED ····

Specify KINNEY CLUTCHES

DON'T let power run away. "Harness" it with KINNEY Clutches for greater operating efficiency and economy. Simple in construction—practically indestructible and with smooth, positive action—they engage without chatter or grab, and assure proper utilization of power. For dependable service under the most difficult operating conditions, specify a KINNEY Clutch.

Write for Bulletin K-8

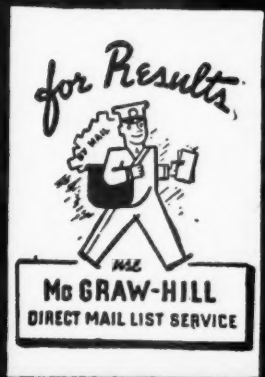
KINNEY MANUFACTURING CO.

3525 WASHINGTON ST., BOSTON 30, MASS.

New York Chicago Philadelphia Los Angeles San Francisco

We also manufacture vacuum pumps, liquid pumps, and bituminous distributors.

What Makes A Mailing *CLICK?*



Advertising men agree—the list is more than half the story.

McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power. They offer thorough horizontal and vertical coverage of major markets, including new personnel and plants. Selections may be made to fit your own special requirements.

New names are added to every McGraw-Hill list daily. List revisions are made on a twenty-four hour basis. And all names are guaranteed accurate within two per cent.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Ask for more detailed information today. You'll probably be surprised at the low over-all cost and the tested effectiveness of these hand- picked selections.

Direct Mail Division

McGraw-Hill Publishing Co., Inc.

330 West 42nd Street *New York, 18, N. Y.*

ACID RESISTING BRONZE

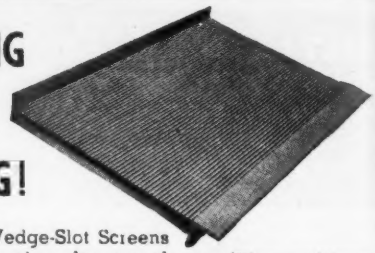
"Flood City" has been casting our own composition in our own foundry since 1907. There are, however, hundreds of different compositions for which various claims are made. For this reason, we, in connection with one of the large ingot manufacturers, recently concluded a comprehensive test of twenty different compositions all in actual use for mine pumps. We were glad to find our own mix superior to 18 and equal to the other one. This gives us added confidence in our claim that Flood City Pumps and Parts will give the best possible service in acid mine water.

Flood City Brass & Electric Co.

Messenger & Elder Sts., Johnstown, Pa.

Branch Office: 4 Virginia St. W.; Charleston, W. Va.

SPEED SIZING AND DEWATERING!



Profiles in Hendrick Wedge-Slot Screens have an opening enlarging *downward*, permitting moisture and undersize particles to clear quickly. No blinding or packing! Deep profile bars increase bearing strength — and rigidity. Write for data on Hendrick Profile Bar Screen — "with continuous slots."

HENDRICK MANUFACTURING CO.

64 DUNDAFF ST. CARBONDALE, PA.

Sales Offices in Principal Cities

PERFORATED METAL
COAL MINING SCREENS

Manufactured exactly to your specifications.
Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

CHICAGO PERFORATNG CO.
2443 West 24th Place
CHICAGO, ILLINOIS
Canal 1459

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RELEASED

UNDISPLAYED RATE:

Not available for equipment advertising

10 cents a word, minimum charge $2.00. (See ¶ on Box Numbers.)

POSITIONS WANTED (full or part-time individual salaried employment only), ½ the above rates.

PROPOSALS, 50 cents a line an insertion.

INFORMATION:

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 10 words additional in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE:

The advertising rate is $6.30 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches —to a page. C.A.

NEW ADVERTISEMENTS received by 10 A. M. November 30th will appear in the December issue subject to limitations of space available.

POSITION VACANT

WANTED: ENGINEER to run property and out-crop lines by a coal company in southern West Virginia. Salary will depend upon ability. Give full details in your first letter to P-328, Coal Age, 330 W. 42nd St., New York 18, N. Y.

POSITION WANTED

POSITION AS Mining engineer or draftsman. Thirty years experience. Registered in State of West Virginia. Good references can be furnished. PW-324, Coal Age, 330 W. 42nd St., New York 18, N. Y.

BUSINESS OPPORTUNITY

COMPANY WITH loaders and other mining equipment for high coal please contact inactive mine owner for attractive proposition to operate property. Describe equipment. BO-320, Coal Age, 520 N. Michigan Ave., Chicago 11, Ill.

Additional
Position Vacant
and
Business Opportunity Ads
on opposite page

WANTED

Full-time Lecturer-in-Charge, Coal Mining Department, Technical Education Branch, Department of Public Instruction, New South Wales, Australia.

Salary £839.2.3 (Aust.) to £893.2.3. (Aust.) p.a. according to qualifications and experience. Salary will be paid from the date the selected applicant takes up duty. Actual first-class travelling expenses of appointee and his family to Sydney will be allowed.

Candidates should preferably be under 40 years of age and possess the following qualifications:

(1) A degree in Mining of a recognized University or equivalent qualifications.

(2) A first-class Certificate of Competency under the Coal Mines Regulation Act or equivalent qualifications.

Applications must reach the Secretary, Public Service Board, 19 O'Connel Street, Sydney, New South Wales, Australia, by 31st December, 1945.

Prominent Australian Company

With representative visiting the United States of America and Canada, wishes to augment its Agency business and is ready to represent in Australia, the manufacturers of Ships, Dredges, Diesel Engines, Winches, Windlasses, anti-fouling Paints, Tool Steels, etc., pre-fabricated houses, and manufactured articles for Agriculture, Mining, Shipping, Building, Hardware and Foundry Trades.

Please write to:—

"TRADE LINK"
C/—Australian Trade
Commissioner's Office
630 Fifth Avenue New York

WANTED
HAULING CONTRACTS
ANYWHERE IN NORTH AMERICA
Large Highway and off the Highway Dump Trucks Available.
No Job Too Large Or Too Small
CROWN TRUCKING
735 Allison Ave., Washington, Pa.

BARGAINS FOR IMMEDIATE DELIVERY!

Frank J. Wolfe

LOCOMOTIVES

2—15-ton Goodman, type 136-A-O-4-C, 250 volt.
4—13-ton Jeffrey, type MH-110, 250 volt.
8—8-ton General Electric, type HM-822, 250 volt.
9—6-ton General Electric, type HM-801 and HM-823, 250 volt.

All Completely Rebuilt and Guaranteed

ROTARY CONVERTERS

2—500 KW Allis-Chalmers, synchronous type, 250/275 volt DC, 2300 volt AC, complete with transformers, switchboards and all appurtenances.

LOADING MACHINES

1—Myers-Whaley #3 Automat. Just taken out of service.
Several 7 and 5-BU Joy Loading Machines.
1—Goodman type 460 Loading Machine.

CUTTING MACHINES

5—7-AU Sullivan, 250 volt DC, 42" gauge, without drills.
4—29-C Jeffrey Arcwalls, 250 volt DC.
5—29-B Jeffrey Arcwalls, 250 volt DC.
Several 3, 4 and 5-track Steel Tipples and Electric Hoists, from 200 to 1500 H.P.

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES COMPANY

306-7 BEASLEY BUILDING — L. D. Phone—34 — TERRE HAUTE, INDIANA

WANTED

Full-time Lecturer in Production Engineering, Technical Education Branch, Department of Public Instruction, New South Wales, Australia.

Salary £839.2.3. (Aust.) to £893.2.3. (Aust.) p.a. according to qualifications and experience, and subject to deductions under the Superannuation Act. Actual first-class travelling expenses of appointee and his family to Sydney will be allowed.

Applicants should have a sound academic training and practical experience in general mechanical engineering work, with specialized experience in production engineering.

Applications must reach the Secretary, Public Service Board, 19 O'Connel Street, Sydney, New South Wales, Australia, by 31st December, 1945.

TO SELL YOUR BUSINESS FOR CASH MAY BE A WISE MOVE NOW

YOU may be relieved of much worry and unnecessary expense.

YOUR company (its personnel intact, as a rule) will gain the benefit of added capital, plus the expert management of an experienced, reputable operating organization.

THERE is profit in it for all. As principals (not brokers) with substantial finances and a background of long experience, we are interested in industrial plants.

• *ALL consultations and negotiations strictly confidential*

Box 1217—1474 Bway, N. Y.

16,500 acres land with estimate of 300,000,000 tons of coal, $7.50 per acre. Also coal land suitable for strip mining. Complete details upon request.

G. B. LORRAINE
Law Bldg. Richmond 19, Va.

NEW & REBUILT ELECTRIC EQUIPMENT CO.
NATIONAL SERVICE — phone us COLLECT
63 CURLEW ST. . . . ROCHESTER 1, N. Y.
P. O. Box 51 . . Phone: GLenwood 6783-4-5

Managing Director

of large Steel Foundry and Engineering Works in Australia will be visiting the United States of America and Canada shortly seeking arrangements to manufacture proprietary and standard lines, particularly those involving steel castings although also capacity for cast iron. Any special Plastic Proposition would also be investigated. All communications addressed to

"STABILITY"
C/—The Union Bank of Australia, Limited
C/—Brown Bros. Harriman & Co., Wall Street, New York,
will receive careful attention.

UNIVERSAL TOOLS! NATIONALLY ADVERTISED BRANDS AND PRICES
If it's Tools—We have it, Can get it, or it isn't made! *Price List & Order Blank Free!!*
UNIVERSAL TOOL COMPANY
O. B. Demattels, President
1527 Grand P. Kansas City, Missouri
Immediate Shipment: Overnight by Air: To Anywhere—USA.

WANTED

INDIANA COAL MINE PROSPECT

For Sale: 1000 acres Sullivan County, Indiana High Quality No. 5 Seam. B.T.U. 14,000 low ash and less than 1% sulphur. Has three otoher seams of Coal. Railroad and highway across same, another railroad and highway about ½ mile. Write

BRENDT OLSON
Route 5, Sullivan, Indiana (Owner)

WANTED TO BUY

1—#14-BU Joy Loading Machine for operation on 250 volts D.C. current complete, used but rebuilt to first-class operating condition. Quote price, f.o.b. point, details of condition, where available for our inspection, and when shipment could be made.

W-331, Coal Age
520 North Michigan Ave., Chicago 11, Ill.

WANTED IMMEDIATELY

ELECTRIC MOTORS
MOTOR GENERATORS
LARGE AIR COMPRESSORS

PAUL JAY
401 Broadway New York 13, N. Y.

FOR SALE:

Going Truck Mine, 55" average height coal, clean coal, good top, hand loaders, coal is trucked to railroad for shipment, 4 to 6 railroad cars per day. 100 HP Diesel power plant, 250 Volts. Goodman mining machine, Jeffrey locomotive, hoist, electric drill, 30 mine cars.

GUYAN MACHINERY CO.
LOGAN, W. VA.

WANTED TO BUY

TWO 32" SHUTTLE CARS
either battery or cable type

W-333, Coal Age
520 North Michigan Ave., Chicago 11, Ill.

WANTED TO BUY

1—#29 L. C. Jeffrey Crawler Mounted Arcwall Coal Cutter for operation on 250 volts D.C. current, used but rebuilt to first-class operating condition. Quote price, f.o.b. point, details of condition, where available for our inspection, and when shipment could be made.

W-332, Coal Age.
520 North Michigan Ave., Chicago 11, Ill.

PROMPT SHIPMENT FROM OUR WAREHOUSE

MINING MACHINES

2—35 BB Jeffrey AC shortwall 220/440 v. 3 ph. 60 cy. 6' Bowdil Bar & Chain, any gauge.
28 A Jeffrey 250 v. 6' cutter bar.
2—12 DA 50 HP 250 v. Goodman Shortwall.
Jeffrey Permissible Top Cutter.

STORAGE BATTERY LOCOMOTIVES

2—6 Ton G.E. Permissible Locomotives 36/44" Ga. O.S. armorplate frame. Inside steel tired wheels. 2-HM 825 Ball Bearing Motors. Type LSBE. Class 2C6 Form C9. 13½' long, 50" high, 69" wide and 44" Wheel base.
Each of the above units equipped with Edison Battery 80 cell A-10—one new in 1940, the other in 1939.
1—5 to 5½ Ton Type D Ironton, 36 or 42" Ga.
1—5 Ton Atlas 40" or 44" Ga. with 2 Ball Bearing Motors. Battery box on top of locomotive.
4 Ton 36" Ga. Atlas 2 BB Motors.
4 Ton 36" Ga. G.E. 2 BB Motors.

Haulage & Gathering Locomotives

13 Ton Westgh. 250 v. 36" or 40" Ga.
13 Ton Westgh. Bar Steel 500 v. 40/42".
10 Ton Jeffrey 500 v. 36/42" Ga.
6 Ton Jeffrey 250 v. 36/42" Ga. with motor driven cable reel.
2—6 Ton G.E. 500 v. 42/44" Ga.
2—6 Ton G.E. 250 v. 42/44" Ga. HM 801 BB Motors, gath.
2—5 Ton 30B Goodman 250 v. 36" Ga. elec. reel.
1—5 Ton Morgan Gardner 250 v. 36/42" Ga. gath.

COAL LOADING MACHINES

4—G20 Goodman Permissible Drives 500 v.
6—#1½ Goodman Duck Bills.
1—#3 Goodman Duck Bill.
2—Brown Favro LF 7½ Pit car Loaders with 500 v. permissible motors.
1—Le Grabon Rock Duster on truck 40/44" Ga.

SCREENS

3—4" x 5' single deck Tyler Hummer Screens. Type 37 equipped with V-16 Vibrators No. 2860 and 2867 designed for 110 v. AC 15 cy.

Rotary Con. & MG Sets (3 ph. 60 cy.)

2—300 KW G.E. HC 12 Rotary 275 v. 6 ph. with—3—125 KVA G.E. 2300 v. 1 ph. 60 cy. Transformers.
150 KW Ridgway 275 v. 900 RPM dir. con. 225 HP Ridgway Syn. Motor 2300 v. complete.
100 KW Ridgway 250/275 v.—150 HP Ridg. Syn. 220/440 v. 1200 RPM with AC & DC Panels.
100 KW GE-RC 250 v. 1200 RPM dir. con. 150 HP 2200/440/220 Induction Motor complete.
35 KW 125 v. S West —54 HP West. 220/440 v.

ENGINE GENERATOR & TURBINE SETS

65 HP Primm Oil Engine belted to AC or DC Gen.
57.5 KVA Allis Chalmers Gen. 220/3/60—Kerr Tur.
50 KW West. 125 v. DC—Skinner Engine.
50 KW 125 v. DC West. Turbo Gen.

TRANSFORMERS

Qu.	KVA	Pri. V.	Sec. V.
31	7½	2200	220/440
28	10	2200	220/440
3	25	22000	2200
2	25	2200	110/220
1	37½	2200	110/220
1	40	2200	110/220
1	50	2200 v.	440/220

HOISTS

150 HP Lambert sgl. fr. drum 66" dia. 54" face—AC or DC Motor.
100 HP Lidgerwood sgl. fr. drum geared to 100 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev. drum & resistance.
50 HP Thomas sgl. fr. drum 26" x 25"—4" figs.
40 HP Lidgerwood sgl. fr. drum geared to 40 HP G.E. slip ring 220/440 v. 3 ph. 60 cy. MTC. Rev. drum & resistance.
30 HP Carlin double dr. fr. 13" x 18"—5½" figs.
10 HP Diamond sgl. fr. drum geared to 10 HP G.E. 220/440 v. 3 ph. 60 cy. Motor.
10 HP Hoist sgl. fr. dr. 22" Face 12" dia. 7" figs. dir. con. 10 HP AC Motor.
The above Hoists can be equipped with AC or DC Motors.

COAL CRUSHERS

18 x 18 sgl. roll Jeffrey.
18 x 24 and 18 x 30 New Scottdale dbl. roll.

CONVEYORS & LOADING BOOMS

L. Boom & Picking Table 5' W 60' Long
Steel Apron conveyor 3' W 120' Long
Steel Apron conveyor 18" W 60" Long
3—7½ HP DC—Joy Chain Conveyors with troughs

SLIP RING & SQ. CG. MOTORS

HP	Make	Speed	WDG	Type
300	West.	1750	S.R.	CW
200	G.E.	250	S.R.	MT 412
150	G.E.	600	S.R.	I-M
150	G.E.	600	S.C.	I-L
150	West.	600	S.C.	CCL
150	West.	580	S.R.	CW
100	West.	1750	S.R.	CW
100	G.E.	500	S.R.	MI-25 cy.
40	West.	1200	S.C.	CS587C
40	G.E.	900	S.R.	MTC
25	West.	575	S.R.	CW
20	West.	1200	S.C.	CS
20	West.	900	S.C.	CS

Other sizes down to 1 HP

DC Motors and Generators 230/250 V.

HP	Make	Speed	Wdg.	Type
175	G.E.	475	ser.	MD 109
150KW	Cr. Wh.	550	cp.	
130	G.E.	550	ser.	CO 1812
100	G.E.	480	ser.	MD 108
100KW	G.E.	1200	cp.	RC
60	Cr. Wh.	800	cp.	
50KW	Cr. Wh.	1050	cp.	
50	Reliance	1500		185T
40	Roth	1750		
20	West.	1500		SK 80L

PUMPS

4" suc. 4" dis. Lee Courtney Cent.—dir. con. 40 HP AC or DC Motor.
100 GPM 300' Head F. M. 2 stage, with 15 HP F.M. Motor 220/440 v. Motor.

AIR COMPRESSORS

9" x 8" Chg. Pneu. Type NSB 175 cu. ft. 100#.

MOORHEAD-REITMEYER CO., INC. Pittsburgh 19, Pennsylvania

Serving the Coal Industry for more than a Quarter of Century

—TRANSFORMERS—

3—833 KVA 13200-240/480 V.
3—667 KVA 6900/12000Y-2300 V.
4—500 KVA 6900/11950Y-2300 V.
3—333 KVA 69300-480 V.
3—200 KVA 22000/11000-230/460 V.

One Year Guarantee

THE ELECTRIC SERVICE CO., INC.

"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
STATION M Since 1912 CINCINNATI 27, OHIO

LATHES

36" x 30' Lodge & Shipley Grd. Hd. A. C. M. D.
27" x 16' Lodge & Shipley Grd. Hd. Taper—

RADIAL DRILLS

6' American Triple Purpose, M.D.
6' Cincinnati Bickford Radial M.D.
7' Cincinnati Bickford Radial M.D.
5' American Triple Purpose Plain.

CINCINNATI MACHINERY & SUPPLY COMPANY

218 E. Second St., Cincinnati, Ohio

FOR SALE

HOISTS

1—Shepard Niles Electric Hoist to raise loading boom conveyors, capacity 2000#, 5 HP, 3 ph, 60 cy, 440 volts, with controls.
1—Ottumwa Electric hoist, single rigid-cylindre-conical drum, with automatic control. Weight of cage 7000#, weight of car 2500#, weight of coal 6000#, lift 310', diameter of rope 1¼". Diameter of drum 60"x84". Brake, 84" diameter, 8" face, post type, oil operated. Drum shaft bearings 10"x20". Hoist is equipped with single reduction gears 19 and 229 teeth, 2½ D.P. 11" face. The drum has five grooves on the 60" diameter, 11 grooves up the cone, 4 grooves on the 84" diameter. The drum has a rope capacity of 326 feet plus three dead turns. The hoist is equipped with a 200 HP motor.

MINING MACHINES

1—Goodman Universal Shortwall mining machine, 112DB. DC, 250 volts, Cincinnati Duplex chain, 6' cutter bar. Has new extra armature. 36" or 42" gauge.
3—Goodman Longwall mining machines, DC, 36" or 42" gauge.
6—Jeffrey 35A Shortwall mining machines, 50 HP motors, 250 volts, DC. 6' cutter bars, 36" or 42" gauge.
3—Sullivan CE-7 Shearing machines, 250 volts, DC. 7 ft. cutter bars, 36" or 42" gauge.
1—Sullivan CE-7 Shearing machine, AC, 220 volts, 3 ph, 60 cy, 7 ft. cutter bars, 36" or 42" gauge.
1—Sullivan CE-7 Shortwall mining machine, AC, 220 volts, 3 ph, 60 cy, tip-turn truck, 7 ft. cutter bar, 36" or 42" gauge.
2—Sullivan Longwall mining machines, AC, #2991, #7061.
1—35B Jeffrey shortwall mining machine, AC, 3 phase, 60 cycle, 220 volts, 36" or 42" gauge, 6 ft. cutter bar.

LOCOMOTIVES

3—Goodman 5 ton locomotives, type W1-2A5, 36" or 42" gauge. One is complete with electric reel.
2—Goodman 6 ton ball bearing locomotives, type 3314T, 36" or 42" gauge.
1—General Electric Co. 8 ton ball bearing locomotive, HM-839A motors. 36" or 42" gauge.
1—Westinghouse 8 ton locomotive, cast iron frame, 36" or 42" gauge.

CRUSHERS

2—Jeffrey Crushers, single roll, size 30x30.
1—Jeffrey, Flextooth type crusher with rotary ring crushing elements, single roll, 24x36, complete with 50 HP Ball Bearing enclosed motor, 1200 RPM no load, 1155 RPM full load, V-belt driven. Crushes from 20" coal to ⅛" stoker coal.
1—American Pulverizer Company crusher, size 31"x36" Ball Bearing type S. Serial No. 1290, No. 24 driven by AC motor enclosed. Fan ventilated type direct connected to crusher by coupling motor, 30 HP, 600 RPM, 440 volts 3 phase, 60 cycle.
1—American Pulverizer Rolling Ring Crusher No. 24. Serial 1030, size 44x38. This crusher has a sub-base and a flexible coupling. No motor. Crushes from 20" down to ¾".

PIT CARS

34—Timken roller bearing cars, 8' overall length, bumper to bumper, 4'3" overall width, 2'5" overall heighth, 18½" Wheelbase, 14" wheels. End dump, one link and pin, 36" gauge.

BOX CAR LOADER

1—Ottumwa new type box car loader. Will load coal from tipple into box car.

STEEL TIPPLES

1—Tipple and shaker constructed by Allen and Garcia Company. Capacity 3000 tons daily.
2—Tipples—smaller capacity than the one listed above

Have new and second hand rails and track accessories.

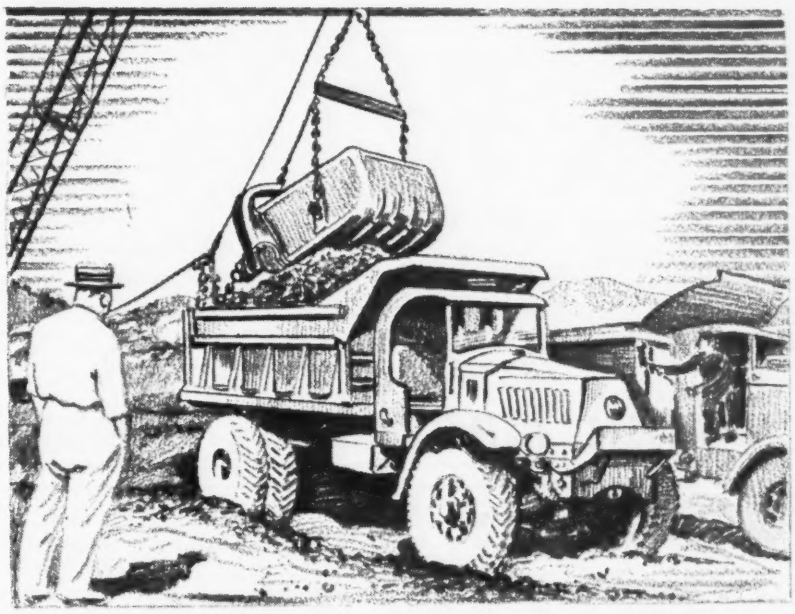
We are distributors for John A. Roebling Sons Company wire rope and fittings.

GAVENDA BROTHERS

CANTON, ILLINOIS

For Stripping, Digging and Hauling

Look to ECONOMY CO. for Equipment and



—"PAY-AS-YOU-GO"—

When you see a good stripping job—*bid it in*—then call on ECONOMY COMPANY for your equipment, for Stripping, Digging and Hauling.

ECONOMY has available Power Shovels, Cranes, Draglines, Tractors, Trucks, Trailers, and all other essential digging and hauling equipment.

Look over the partial listings below, then phone us your requirements, without delay. We will arrange for early inspection and demonstration, and quickly complete the details.

Remember, too, our "Pay-As-You-Go" Plan is always available to all responsible stripping Contractors. *Wire or Phone your needs to this office today.*

1—3-5 yd. **Bucyrus-Erie 120B Electric Shovel.** Serial up in 10000s. Manganese steel dipper. Ward-Leonard Controls. Condition real good. Price.....$41,000

1—4-yd. **Bucyrus-Erie Model 100B Shovel and Dragline combination.** 90′ Boom. Two dragline buckets. Serial in high 11000s. Spare parts.

1—3-yd. **Diesel Marion Model 40A.** 80′ Boom. Entirely rebuilt in 1945. 3 yd. dragline bucket. Price $31,000

1—3 yd. **Diesel Bucyrus-Erie 52B Dragline.** Serial number in 11400s. 80′ Boom. Price.....$23,800

1—2¾ yd. **Page Diesel Dragline.** 116′ Boom. Exceptionally nice condition. Reasonably priced.

1—2½ yd. **Diesel Osgood Model 90B Dragline.** 85′ Boom. Two dragline buckets each 2½ yd. capacity. Power supplied by Buda Diesel Engine Model LD1742. Serial number of machine is in 3000s. Offered in rebuilt and guaranteed condition for $29,800. **This is a real buy.**

1—2½ yd. **P&H Model 800 Diesel Dragline.** 80′ Boom. Built about 1940. Serial number up in 4800s. Price $21,950

SPECIAL

1—2½ yd. **Northwest Model 95 Diesel Dragline.** Serial number up in 5400s. 36″ tracks. 80″ dragline boom. Murphy Diesel Engine. In exceptionally good condition. Price $31,400

1—2½ yd. **Diesel Northwest Model 80D Dragline.** 80′ Boom. Built in 1939. Brand new Murphy Diesel Engine installed 1944. Machine rebuilt 1945. Price $25,600

1—2½ yd. **Northwest 80 Shovel and Dragline combination.** Gas powered. Entirely rebuilt.

1—2½ yd. **Northwest Model 8 Dragline.** 90′ Boom. Twin City Engine. Serial number in 4000s. Price $15,900

1—2 yd. **Bucyrus-Erie Diesel Dragline Model E-2.** 60′ dragline boom. Serial number in 11000s. Price $14,800

1—2 yd. **Diesel Koehring Model 801 shovel and dragline combination.** Rebuilt.

1—2 yd. **Northwest Model 70 Shovel and Dragline Combination.** 60′ Boom. Price.....$17,600

1—1¾ yd. **Lima Diesel Model 750. Shovel and Dragline combination.** In real good condition—with a guarantee for $21,500.

1—**Marion Diesel Model 471 Shovel and Dragline.** 1¾ yd. for shovel work and 2½ yd. for dragline operation. 80′ Boom. Price $26,500 including buckets, etc.

1—1¾ yd. **Marion 471 Diesel-Electric Shovel and Dragline combination.** 60′ Boom. 2¼ yd. dragline bucket. 1¾ yd. shovel attachment. Entirely rebuilt. Price $26,400

1—1¾ yd. **Diesel Lima Model 601 Shovel.** Price $18,200

1—1¾ yd. **Diesel Bucyrus-Erie Shovel.** 2¼ yd. dragline bucket. 80′ boom. Buda Diesel Engine. Price $27,500

1—1¾ yd. **Diesel Koehring Stripping Shovel Model 702.** Long boom and long stick. Price.....$16,400

1—1¾ yd. **Diesel Osgood Model 906.** 35′ shovel boom. 30′ dipper stick. Price.....$25,000

1—1¾ yd. **Diesel P&H Model 775**—extra wide and extra long cats. A real buy! Price.....$12,450

1—**1942—Diesel Koehring Model 604 combination.** 1¼ yd. 30″ Shoes. Kohler Lighting Plant. 26′6″ boom and 16′6″ dipper stick. Clamshell, crane and dragline attachments. Powered by Caterpillar Diesel Engine. Price on request.

1—1½ yd. **Diesel Lorain 77 Shovel and Dragline combination.** Serial number in 5100s. Powered by Caterpillar Diesel Engine D11000. Price.....$14,250

1—1½ yd. **Diesel Northwest 6 Shovel and Dragline** with Caterpillar Diesel Engine. Built in 1941. Excellent condition. Price $17,800

1—1½ yd. **Osgood Diesel "Victor" model stripping shovel.** 28′ Boom. 24′ Stick. Caterpillar D13000 Diesel Engine. Price $18,900

1—1½ yd. **Northwest Shovel and Dragline Combination.** Model 6. 75′ dragline boom. Price.....$14,200

1—1½ yd. **Lorain 57B Diesel shovel dragline and crane combination.**

1—1½ yd. **Diesel Osgood Shovel** with Caterpillar D8800 Diesel Engine.

1—1¼ yd. **Northwest Model 5 shovel** and dragline combination. Serial number in 2800s. Price only $9800

1—1 yd. **Lorain 60.** An exceptional buy. Entirely rebuilt. New cab. Waukesha 4-cylinder gas engine. 1 yd. Manganese Dipper $5750

1—¾ yd. **Diesel Linkbelt Speeder Model B-5.** Serial number in 1150s. Caterpillar D8800 Diesel Engine. Price only $7100

1—¾ yd. **1939 Diesel Linkbelt Speeder Model B5 Shovel** and Dragline combination. Rebuilt and guaranteed. Caterpillar D8800 Diesel Engine. Brand new tracks. **Price** $11,250

1—¾ yd. **Marion 331.** Serial number up in 6700s. Condition good. A lot of new parts. A real bargain for $6100.

1—¾ yd. **1941 Koehring Model 251 Shovel,** Crane and Dragline combination. Price.....$10,150

1—¾ yd. **1940 Lorain Model 40 shovel,** backhoe and crane combination. Chain Crowd. Price.....$9700

1—¾ yd. **Koehring Model 301 shovel** and crane combination. Price $5100

1—¾ yd. **1938 General Shovel.** Serial in 1800s. Price $8200

TRACTORS

1—**International TD-14 Diesel Tractor** with Bucyrus-Erie Angledozer in good condition. Price...$3650. Texas location.

1—**TD40 Caterpillar Tractor** with Bucyrus-Erie bullgrader, very late model—serial number up in TCC9300s. Price..$3950. Texas location.

1—**TD9 International Tractor** with Bucyrus-Erie bullgrader is available in Virginia for $3300.

2—**TD18 International Tractors**—late models. Serial number of one in TDR1480s and the second one in TDR1740s. Both with double drum LeTourneau power units. Price .....$3850 each.

1—**RD7 Caterpillar Tractor**—serial number in 9G1700s with power unit and LeTourneau UL 9 yd. Scraper can be purchased for $5900. Southern location.

3—**RD8 Caterpillar Tractors**—serial numbers in 1H2900s—with double drum power units and YR13 Scrapers. In rather good condition. Available Midwest. $7250 each

2—**D4 Caterpillar Tractors** with LaPlant-Choate hydraulic bulldozer. Built in 1941 or 1942—can be purchased for $3200 each.

1—**1941 Caterpillar D6 Tractor** with LeTourneau Angledozer—in excellent condition. Price.....$4750

SPECIAL

1943 (December) Caterpillar D4 Tractor with a LaPlant-Choate hydraulic dozer and Athey Front End Loader Shovel of 1⅛ yd. capacity. A real buy for.....$4800

2—**Late model D7 Caterpillar Tractors.** Serial of one in 9G7000s, the second 9G4800s. One is equipped with double drum power control unit and the other with a pusher block. Price..... .....$3600 each

1—**RD7 Caterpillar wide gauge tractor**—serial number in 9G2400Ws with LeTourneau double drum power unit and LeTourneau bulldozer. Price.....$4650

6—**RD8 Caterpillar Tractors** with 12 yd. scrapers. Condition good. Price exceptionally attractive.

2—**Late model D8 Caterpillar Tractors** with 12 yd. scrapers, double drum power units and LeTourneau Bulldozers. Price .....$10,450 each

1—**7M Streamlined Caterpillar D7 Diesel Tractor.** Serial number up in 7M1700s with double drum power control unit and LS 10 yd. LeTourneau Scraper. Price $7950

A Real Bargain.....1—Model FD Diesel Cletrac Tractor—in real good operating condition. Serial number in 6600s. Price.....$2700. Midwest.

TOURNAPULLS

3—Tournapulls Super "C"—built the latter part of **1941. Price** .....**$6400 each**

For any other construction equipment that you might be interested in, please phone or wire us, presenting your requirements, and a prompt proposal will be forthcoming. May we have the pleasure of hearing from you?

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Tels. MUrray Hill 4-2294-8292-2295-2296

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Goodman: All 250 volts.
1—10 ton, 31 1-4-T.
1— 6 ton, 30B, 43" 1—5 ton.
1— 5 ton, W-1-2, 36".
2— 5 ton, 2600 K.
1— 6 ton, 33-1-4-T.
2— 8 ton, 32-1-4-T.
2—15 ton 29A, 48" gauge.

Westinghouse: All 250 volt.
1—4 ton, 902, 48".
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.
Bar steel frames 10 ton, 6 ton, and 4 ton.

G.E.: All 250 volt,
6 ton 803, 44" as is
6 ton 823, 44"
6 ton 801
8 ton 839
4 ton 1022, 44" as is
5 ton 825, 44" & 36"
8 ton 839 motors
Battery Locomotives G.E., Ironton and Atlas.

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt.
8 ton and 10 ton.

MINING MACHINES

Jeffrey, 35B and 4—28A, 250 V. 4—29B, 29C.
29CE with shearing head.
Revolving head for 29C.
35BB **Jeffrey** mining machine.
1—35 BB AC 220 volt.
Goodman, 12A, 12AB, 12AA, 12G3A, 24B.
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA.
2—124 E.J.
Motors for 212AA, both 250 and 500 v.
Sullivan, CE7, CE9, CE10. CR10 Low Vein.
CR5 for middle cutting.

SUBSTATIONS—275 volts, D. C.

2—200 KW **G.E.** Rotaries (600 volt).
2—150 KW **West.** Rotary.
1—200 KW 1—100 KW **Ridgway** M-G Sets.
2—100 KW **G.E.** Rotary.
1—200 K W **Westinghouse** M-G Set 900 RPM, 2300-275 volt.
1—100 KW **Westinghouse** M-G Set.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, 29B, 35B and 28A. **Goodman** 34B, 30B, 30C, 12A, 12AB,, 12AA, 33-1-4-T, 31-1-4-T. **General Electric** 801, 803, 819, 821, 825, 839. **Westinghouse** 904, 906, 102, 907, YR2, 115. Also 200 KW **Westinghouse Rotary Converter Armature,** 250 V Bracket Type, 150KW G E., HCC Bracket Type, and 150 KW G. E., TC Pedestal Type.

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500 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
300 KW AL-CH SYN 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type 2300/4000 V. Transformers.
300 KW G.E. SYN. 275 V., HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
300 KW G.E. SYN 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
150 KW WEST. SYN, 275 V. 6 Ph., 60 Cy., 1200 RPM, Bracket Type, 2300/4000 V. Transformers.

MOTOR GENERATORS

300 KW G.E. SYN. 275 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Semi-Automatic Switchgear.
300 KW G.E., SYN. 600 V., 2300/4000 V. 3 Ph., 60 Cy., 1200 RPM, Semi-Automatic Switchgear.
300 KW WEST. SYN., 275 V. 2200/4000/6600 V., 3 Ph. 60 Cy., 900 RPM, Manual Switchgear.
150 KW WEST. SYN., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.

LOCOMOTIVES

15-T WESTGHSE., 250 V., 908-C Mts., 36"-44" Ga.
15-T WESTGHSE., 500 V., 908-C Mts., 36"-44" Ga.
13-T WESTGHSE., 500 V., 908-C Mts., 36"-44" Ga.
13-T JEFFREY, 500 V., MH-110 Mts., 36"-44" Ga.
13-T G. ELEC., 250 V., HM-829 Mts., 36"x42" Ga.
10-T WESTGHSE., 500 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHSE., 250 V., 907-C Mts., 36"-44" Ga.
8-T WESTGHSE., 500 V., 906 C Mts., 36"-48" Ga.
13-T GOODMAN, 500 V., 36 B Mts., 36"-42" Ga.
8-T WESTGHSE., 250 V., 906 C Mts., 36"-44" Ga.
8-T GEN. ELEC., 250 V., 839 Mts., 36"-48" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

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INCORPORATED
501 Grant Building Pittsburgh, Pa.

COAL CUTTING MACHINES

3—35B Jeffrey 250 V. shortwalls.
1—35BB Jeffrey A.C. shortwall.
2—35B Jeffrey 500 V. shortwalls.
1—124EJ Goodman, 50 HP, 250 V. permissible track mounted slabbing machine.
1—12DA Goodman, 50 HP, 250 V. D.C.
1—29C Jeffrey top cutting arcwall 250 V. D.C. on "Cats".
1—12G3 Goodman, shortwall, 3/60/220 V. A.C.
1—12AB Goodman shortwall, 250 V. D.C.

ELECTRIC LOCOMOTIVES

1—13 Ton GE with HM-809 motors.
1—10 Ton GE steel frame, 250 V., HM-830A motors.
1—10 West. with 907-C motors, 250 V., 42" gauge, bar steel.
1—6 Ton West. bar steel frame, with 904-C 250 V. motors.
2—6 Ton Jeffrey, MH-88 motors, any gauge
1—5 Ton G.E. ready to operate, 42" gauge.
2—5 Ton Goodman 250 V., 36" gauge.
1—4 Ton Jeffrey MH-96 motors.

MISCELLANEOUS

1—300 KW G.E. Syn. M-G Set, 250 V., D.C.
3—8BU Joy Loading Machines, 250 V., D.C.
1—165 HP GE Syn. 2200 V., 900 RPM motor.
1—100 KW GE type TCC, Form P. Rotary Converter, 275 V. D.C. with 2300-4000 volt transformers.
1—907-C West. motor & axle caps.
1—100 Ton Wheel Press

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1—Vulcan, Band Friction, will coil in excess 5000 ft. 1" rope. 200 H.P. 2200 Volt Motor and Control
1—Wellman, Keyed Drum, 60" Dia. will coil 4500 ft. 1" rope. 200 or 300 H.P. Motor with Magnetic Control.
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1—Nordberg, Shaft Hoist. 72" Dia. Suitable 200 ft. Shaft. 150 H.P. Motor with Control.
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Other Hoists available to suit all mining conditions.

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12—Diesel 105, 315, 520, 676 & 1000 ft.
6—Electric 1300, 1500, 2200, 3000 ft.
RUBBER CONVEYOR BELTS:
1000', 60". 600', 30". 300', 20". 1000' 42". 900', 48". 1450', 36". 1200', 24". 900', 18". 600', 16". 350', 14".
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15—3, 5, 8 ton Battery & Trolley.
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Coal Cutting Machines

11—CE-7 Sullivan Shortwall AC Coal Cutters, 30 H.P. Motors, 7½' Cutter Bars, Tip-Turn Trucks and approx. $5000. worth of new parts. We can make attractive prices on these machines. All in guaranteed condition.

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1½ to 10 Ton 13" to 56" Track Gauge
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3' x 6' Single Deck Screen	495.00
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Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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ENDLESS "V" BELTS

"A" WIDTH All Sizes	"D" WIDTH All Sizes
"B" WIDTH All Sizes	"E" WIDTH All Sizes
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FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
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2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
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RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	Per Length
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1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

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1 Quickway Truck Crane
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1—Starting Compensator, No. 856644, Type #NR2040, Form A3, Volts 2300 for Synchronous Motor, ATI KVA150, Cycles 60, Phase 3, G. E.

Following D. C. Electric Motors:

1—Jantz & Liest Motor, 20 H.P., 110 V, 1050 RPM, Serial #1320.
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1—Emerson Regulating Starter, Cutler Hammer.
1—Emerson Motor, 1 H.P. 115 V. 1750 RPM, Serial #78607.
1—Emerson Regulating Starter, G.E.
1—Allis Chalmers Motor, 20 H.P. 110 V, 1000 RPM, Serial #7DK28.
1—Allis Chalmers Starter & Switch.
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2—Stoker Feed Boilers
1—419 H.P.—150# Pressure
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1—Westinghouse Steam Turbine—625 KVA 3600 R.P.M.—2300 Volts
1—General Electric Steam Turbine—500 KW—3600 R.P.M.—2300 Volts
Condensers - Panel Board
All Auxiliary Equipment

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Coal Age, published Monthly at Albany, New York, for October 1, 1945.

State of New York }
County of New York } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. A. Gerardi, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Coal Age and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the name and address of the publisher, editor, managing editor, and sales manager is: Publisher, McGraw-Hill Publishing Company, Inc.; Editor, Ivan Given; Managing Editor, None; Sales Manager, H. R. Mathias all of 330 West 42nd St., New York 18, N. Y.

2. That the owner is: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York City. Stockholders holding 1% or more of stock: James H. McGraw, James H. McGraw, Jr., James H. McGraw, Jr., Curtis W. McGraw and Edwin S. Wilsey, Trustees for: Harold W. McGraw, James H. McGraw, Jr., Donald C. McGraw, Curtis W. McGraw, all of 330 West 42nd Street, New York City. Edwin S. Wilsey and Curtis W. McGraw, Trustees for James H. McGraw, 3rd, Madison, New Jersey; Curtis W. McGraw, 330 West 42nd Street, New York City; Donald C. McGraw, 330 West 42nd Street, New York City; Mildred W. McGraw, Madison, New Jersey; Wilson C. Laucks, Spruce and Canal Sts., Reading, Pa.; Grace W. Mehren, 73 No. Country Club Dr., Phoenix, Ariz.; Margaret Stump, 1418 Rose Virginia Rd., Wyomissing Park, Reading, Pa.

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4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

J. A. GERARDI, Secretary
McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 20th day of September, 1945.

[SEAL] ELVA G. MASLIN

(My commission expires March 30, 1946.)

REBUILT EQUIPMENT—READY TO SHIP

MOTOR GENERATOR SETS

1—110 kw. 500 v. DC Gen. 1750 rpm. dir. conn. to 150 HP 1800 rpm. 440 v. 3 ph. 60 cy. type CS induction Motor.
1—75 kw. 230 v. 850 rpm. G.E. Gen. dir. conn. to 220/440 v. 3 ph. 60 cy. Motor.
1—65 kw. 230 v. 1150 rpm. West. Gen. dir. conn. to 220/440 v. 3 ph. 60 cy. Motor.
1—50 kw. 230 v. 720 rpm. West. Gen. dir. conn. to 220/440 v. 3 ph. 60 cy. Motor.
1—40 kw. 230 v. 1150 rpm. West. Gen. dir. conn. to 220/440 v. 3 ph. 60 cy. Motor.

MINING MACHINES—250 v. DC

1—CE-7 Sullivan 36" ga.
1—Armature for CE-7 Sullivan 250 v. DC.

MINE LOCOMOTIVES

1—5 ton Ironton Storage Battery Locomotive.
1—13 ton Westinghouse 42" ga. 250 v. Locomotive, two motor type: single end control.

PUMPS

1—Amer. Piston Pump—5½x4½"—size 8x12.
1—48 GPM 161' hd. Roper 3" suc. 3" dis.
1—90 GPM 225 ft. head, 600 rpm. 2x2" Blackmer
1—135 GPM 40' hd. Le Courtenay Cent. Pump.
2—200 GPM 80' hd. Le Courtenay Cent. Pumps.
1—220 GPM 225 ft. head, 600 rpm. 3½"x3" Blackmer
1—230 GPM Amer. Steam Pump Co. 115' hd. 5½" intake x 4½" discharge, 45 rpm.
1—300 GPM 10' hd. Chicago 3" Vert. Sump Pump.
1—3000 GPM De Laval 144' hd. 150 HP.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
700	G.E.	MT-432	2200	393
260	Burke	EMV-65	440	600
260	Burke	EMV-65	2200	600
50	Chand.		220/440	1800
30	West.	CW	220	900
15	West.	CW	220	870

230 V. DC MOTORS

HP	Make	RPM	Type
5	Cr. Wh.	960	CM
5	Cr. Wh.	980	CM
5	Imperial	540	SK
5	Westg.	850	
10	Cr. Wh.	825	CM
10	Cr. Wh.	675	CCM
20	Lincoln	720	
25	Lincoln	900	
25	West.	1750	SK-83
30	Lincoln	1200	
40	West.	850	S-7
50	West.	525	S-12
75	G.E.	600	MP
80	West.	490	76A
100	West.	300	SK
100	West.	300/700	SK
100	West.	625	S-13L
180	West.	800	SK-170

TRANSFORMERS

No.	Kva.	Prl.	Sec.	Make
9	5	2200	110/220	G.E.&West.
100	7½	2200	110/220	G.E.&West.
16	10	2200	110/220	G.E.&West.
21	15	2200/1100	440/220/110	West.
3	15	2200	110/220	Packard
3	15	2200	110/220	Cr. Wh.
2	20	1150/2300	115/230	Maloney
1	20	2300	110/230	West.
2	20	2200/1100	440/220/110	West.
2	25	2300	110/220	West.
1	37½	2400	240/480	G.E.
3	40	2200/1100	220/110	West.
1	40	1100/220	110/220	Pittsburgh
1	40	2300/1150	115/230	Maloney
2	50	2200	110/220	Packard
1	50	6600	550/440	Allis Chal.
1	50	2200/1100	220/110	West.
2	50	2200/1100	220/110	Maloney
1	75	2400	240/480	G.E.
1	75	2400/4160Y	120/240	West.
3	100	2400	480	Allis Chal.
1	112.5	2400	240/480	G.E.
3	125	2200	220/440	G.E.
2	150	2200/2300/2400	220/230/240	G.E.
3	250	6600/5940	2300	West.

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1—29-C Jeffrey Arcwall, 44" gage, 250 volt
1—29-C Jeffrey Arcwall, 42" gage, 250 volt
1—29-B Jeffrey Arcwall, 48" gage, 250 volt
2—12-AA Goodman Shortwalls, 42" gage, 250 volt
1—12-AB Goodman Shortwall, 42" gage, 250 volt
1—112-AB. Goodman Universal, 250 volt
1—CR-8 Sullivan Shortwall, 250 volt
2—35-L Jeffrey Shortwalls, 220-440 volt A.C.

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1—80-KW. Westinghouse M-G Set complete, 275 volt Generator, 2300 volt Synchronous motor, complete switchboard.
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1—200-KW. G.E. Rotary converter outfit complete with 2300 volt transformers, 275 volts D.C.

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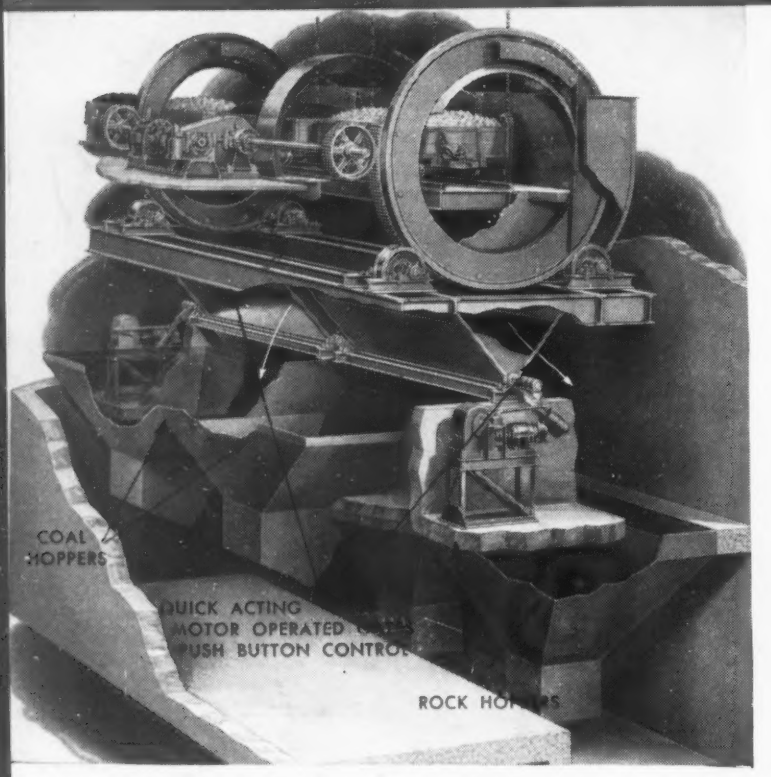

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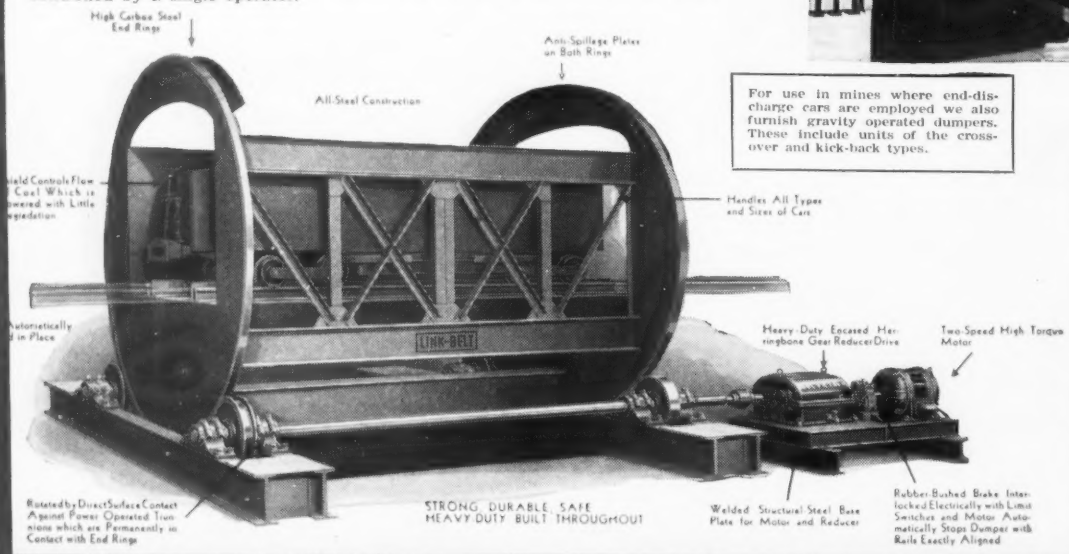
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Railroad Car Unloader

With this unit, a full cycle of dump and returning to normal position is accomplished in 55 seconds. The whole operation is so simple, automatic and foolproof that unskilled labor can perform it readily.

Traction-Type Full-Revolving Dumper for Swivel-Coupled Mine Cars

One man controls the complete operation. Through a push button or lever the dumper is automatically started, slowed down to facilitate easy, gentle unloading and stopped with tracks in line to receive oncoming cars. Cars are automatically held down in place, completely turned over and discharged cleanly without spillage. Thoroughly protected by safety devices.

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by LINK-BELT

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